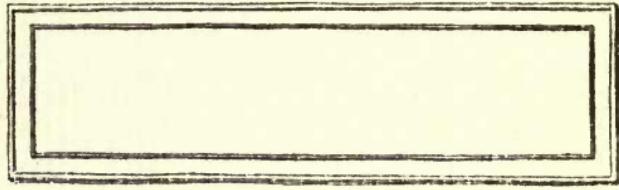
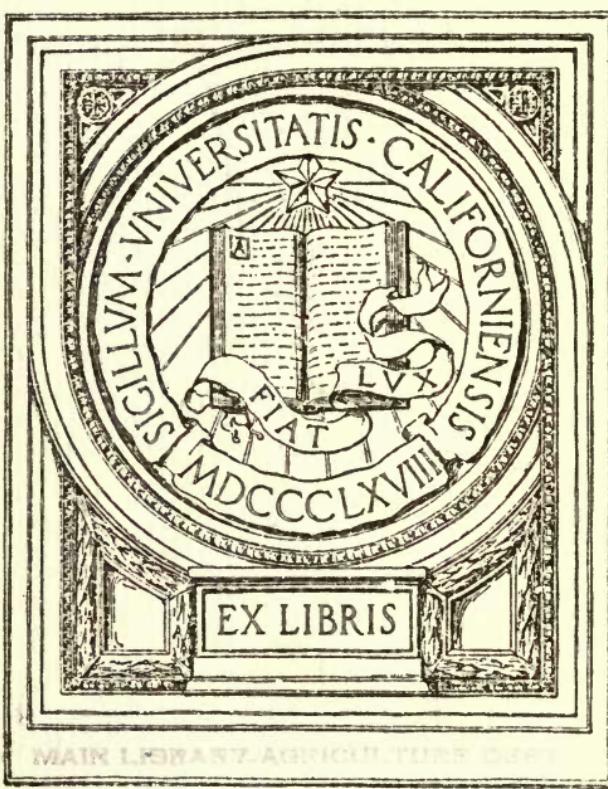


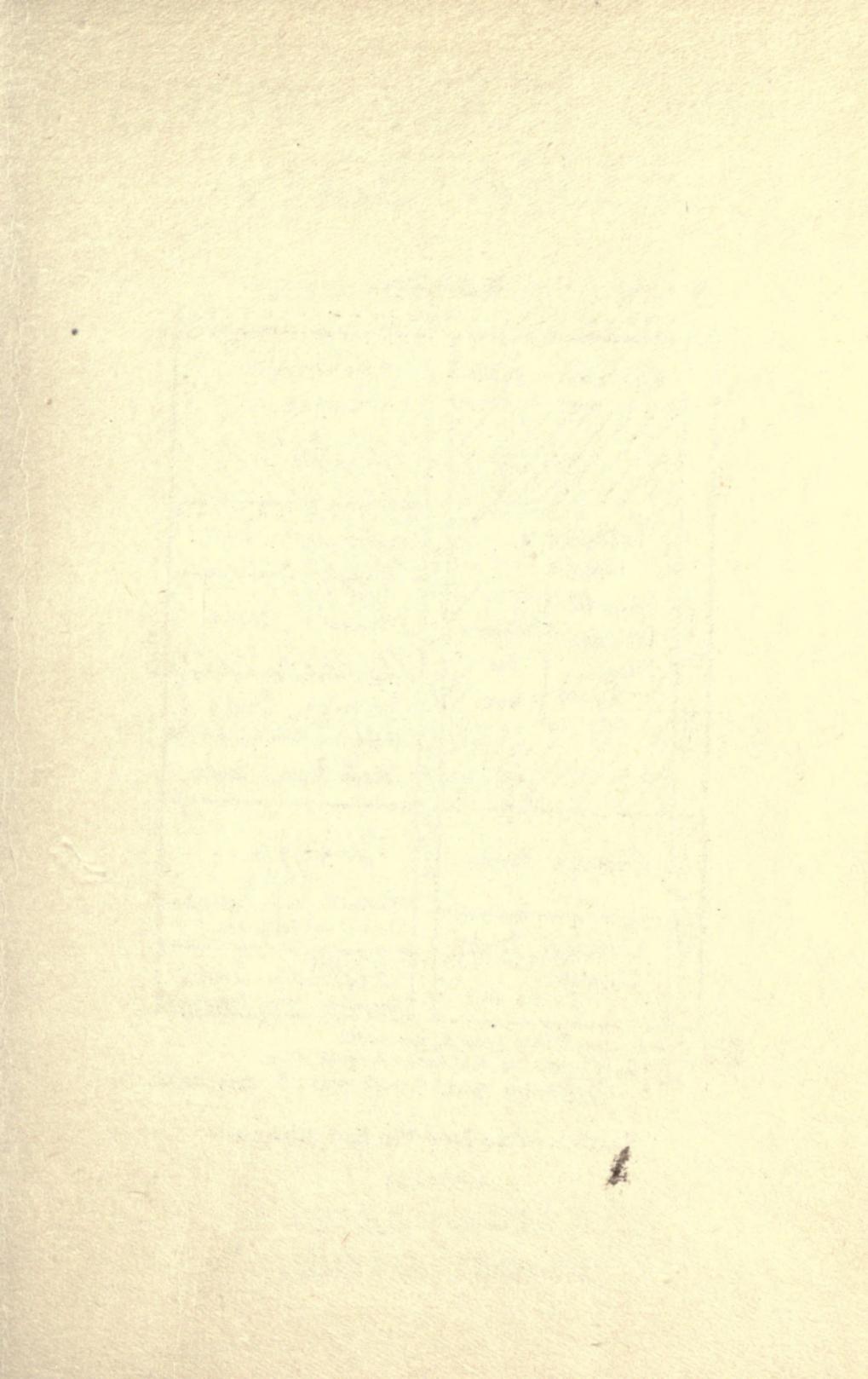
GROW YOUR OWN VEGETABLES

STANLEY C. JOHNSON, D.Sc., F.R.E.S.

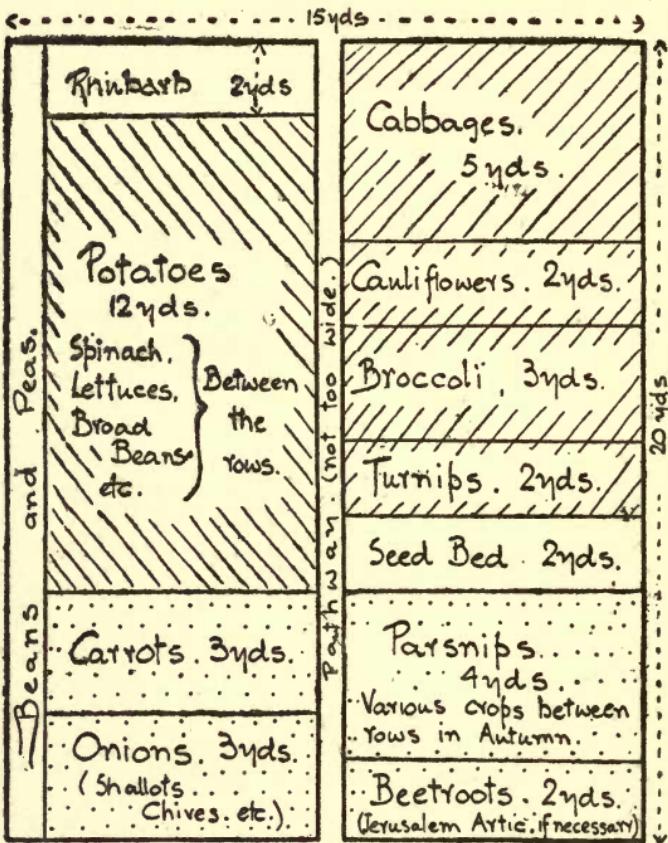




GROW YOUR OWN VEGETABLES



NORTH



■ = A, this year; B, next year; C, year after
 □ = B, this year; C, next year; A, year after.
 △ = C, this year; A, next year; B, year after.

PLATE 1.—Plan for a Ten Rod Allotment.

GROW YOUR OWN VEGETABLES

A Practical Handbook for Allotment
Holders and those wishing to Grow
Vegetables in Small Gardens

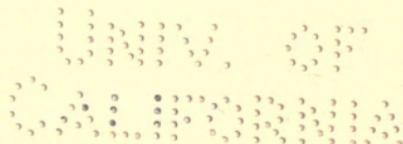
WHAT TO GROW
WHERE TO GROW
WHEN TO GROW
HOW TO GROW

BY

STANLEY C. JOHNSON, D.Sc., F.R.E.S.

*Author of "Nature Photography," "Pond and
Stream Life," etc.*

WITH 119 DIAGRAMS



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"Every encouragement should be given to the movement on foot for the purpose of creating a National Union of Allotment Holders. Those little cultivators did splendidly last year and, on what appears to be good data, it is estimated that they came in to the extent of nearly three-quarters of a million persons. Although it is not possible to estimate the addition this meant to the food supply of the country, it must be extraordinary.

"England is a land of good gardeners, and the skill, industry and ingenuity with which the most unpromising plots were attacked augurs well for the possibilities attending an extension of the movement. Those who have watched serious elderly men and laughing school children working with equal ardour at the unpromising allotment will not only be highly pleased with the results, but filled with confidence that soil of any kind can be attacked with the certainty of making it contribute to the food supply of the country."—*Country Life*.

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GROW YOUR OWN VEGETABLES

CHAPTER I

PRELIMINARY CONSIDERATIONS

DURING the year 1916 the knowledge became common that, if food were not to be the deciding factor of the War, it was the clear duty of all to take a hand at growing produce. Thousands of us readily responded to the new demands; those who possessed gardens pushed the pretty flowers and the attractive shrubs to one side and planted more useful crops in the vacant spaces; we dug up lawns and sowed them with potatoes and filled our window boxes with onions and carrots. But valuable as this new movement was, it did not go far enough, for a family of four or five cannot exist on the vegetables grown in the average town or suburban garden. Accordingly, the cult of the allotment sprang into being, and now it is the exception rather than the rule to find an able-bodied householder who has not an interest in a plot which he tends with loving care on Saturdays, Sundays, and whenever else he has a moment to spare.

That the country is much indebted to the allotment-holder no one can gainsay, for during the first season of the movement 180,000 war-time plots were worked

under the Cultivation of the Land Order, representing 13,263 acres. Add to this the gardens which from one end of the country to the other were devoted to vegetable culture and we are able to form some idea of the tremendous amount of food that was grown privately in the first year of great need.

Securing a Plot.—The demand for plots which started so well shows no signs of abating ; in fact, during the next two or three years, apart from the issue of the War, we may anticipate a great influx of eager recruits, all keen on making their little patch a friendly rival to the Garden of Eden. Newcomers should apply to the Local Borough or Urban District Council, or Parish Council for a holding. These authorities have power to commandeer land for the provision of allotments of not more than five acres in extent, and, if these bodies do not act, the would-be allotment-holders may demand them to. Failing satisfaction from this quarter, the County Council should be requested to act and, if this body cannot or will not make the necessary provision, the final court of appeal is the Board of Agriculture. The London County Council, it may be mentioned, can provide holdings, but is in no way obliged to. The Vacant Land Cultivation Society, 14, Buckingham Street, Strand, will also attend to the wants of Londoners.

As may be expected, some authorities are doing but little to foster the movement whilst others are leaving no stone unturned to make it a deserving success. Birkenhead's activities in this direction have been so thorough that the *Journal of the Board of Agriculture*

has seen fit to detail them at length in a recent article. Here are the facts as summarised in *The Smallholder*.

At the beginning of the year the Local Council appointed an Allotment Committee, which was given full power to act. This Committee immediately—(1) secured stocks of implements in order to forestall attempts to raise prices or any failure to obtain supplies; (2) obtained firm offers of seed and accepted quotations; (3) organised manure supplies; (4) arranged for bringing-on under glass (in consequence of the late start) large quantities of plants for spring planting; (5) prepared schemes which were laid before the inhabitants.

The Committee then turned its attention to effecting the fullest possible increase in the number of allotments in the town. To every man or woman who desired one an allotment was offered, with the result that in three months' time about 2,500 allotments were under cultivation within the Borough.

The principles on which the Committee worked were as follows: (1) It selected and tested all land in order to ensure reasonable returns for the labour spent on it. (2) An economic rent was charged so that serious cultivation might be safeguarded. (3) A water supply was provided. (4) Professional advice was available for those who needed it. (5) And the work of each plot-holder was periodically inspected in order that the best interests of the community might be preserved.

The Committee took up in other ways the work of food production. Schemes for school gardens, to be used for food production, were prepared and approved by the Board of Education. The land was provided by

the Committee, and cultivation went on during school hours.

The Volunteers were approached, with the result that digging took the place of drill. The girls in factories did their part as did those engaged in large shops, the heads of the establishments arranging with the Committee for land and organising their own staffs in cultivation. Men, also, who had been exempted by the Tribunals, gladly gave spare time to the work.

Birkenhead estimated that these activities accounted for one-fifth of the town's vegetable needs ; such is their splendid record which other authorities might well copy.

As a rule, the would-be allotment-holder will be offered no choice in the selection of the plot offered him. Should, however, he be able to exercise a preference, he ought to make as careful a survey of the ground as time will permit. The plot should be situated as close to his house as possible. Unless it is within convenient distance, it will be robbed of countless little visits during the season which are so necessary to the nursing and tending of delicate plant-life. It should enjoy an open situation. Overhanging trees cause a deal of trouble ; they cut out the sunlight, they ruin crops by dripping on to them, they scatter their leaves in the fall and their flowers in the summer, and so cause unnecessary and often harmful litter, and their roots rob the ground of moisture and nourishment. Walls and fences, too, are unwelcome when they screen the sunny-side of the plot, but they certainly prove advantageous in keeping out trespassers, both human and otherwise. If the ground is not flat, a plot in a dip or hollow should be avoided, as it will

probably be damp and cold, especially in the winter, when the best of conditions are absolutely essential to the well-being of whatever crops are still bedded out. A plot on a gentle slope has much in its favour if it faces towards the sun, but not otherwise. Any aspect from north-east to north-west *vid* the north is likely to prove unsatisfactory, as it will not get its fair share of warmth and sunshine. Of course, a plot that runs sharply down the side of a hill or embankment will give a good deal of trouble and prove very wasteful of space. The position of the plot with regard to roads and paths is another matter for consideration. A dusty highway, littered with paper and leaves, will provide the allotment-holder with all sorts of vexations when gusty weather sets in.

But the most important considerations of all bear on the composition of the soil and its covering. Grass will probably be the most likely surface covering of the plot, but there is grass and grass. Turf of the kind we find on lawns—it will naturally be coarser—is as easy as any material to deal with. It should be skimmed off the surface and buried face downwards when digging the holding (Plate 3, Fig. 3). Should wireworms be present in any quantities—these are tiny things about three-quarters of an inch long, of a shiny yellow chestnut colour, possessing a few hairs on the body—it will be well to shave the sods off the surface fairly thinly, turn them upside down and leave them so for a week. The birds, especially plovers, rooks, and starlings, will come and make many a meal off them, much to our satisfaction. Then it will be well to sprinkle Vaporite, lime or soot, and give the land a dressing of superphosphate at sowing

time. When the grass is of the couch or twitch variety a good deal of trouble may be anticipated unless the creeping roots be skimmed off the surface and buried two feet or more down or thrown on a bonfire and burnt. The latter plan is the better, though more tedious, as the ashes from the fire provide a valuable potash of which the country is now very short. Rank weeds, such as thistles and docks, should be dug out with as much of their roots as possible ; it will be a false economy of time to snap off the heads and leave the roots to continue growing.

Now as to the soil. Where such is possible, it will be an admirable plan to dig two or three holes about three feet deep, in various parts of the holding. By inspecting the sides of the holes, we may learn the depth of the top spit, the composition of the under layers, and, if we leave the holes open for a day or more—carefully covered over at nights, of course—we may get to know whether drainage is good or bad.

Black soil is usually considered of great merit, the reason being that it contains a high percentage of humus, a vegetable constituent of the soil which, by a gradual process of decay, liberates carbonic acid and so manufactures a necessary ingredient of plant food. Humus, it may be said, is generated by returning to the soil all kinds of vegetable refuse and by supplying dressings of stable manure. Black soils, also, are the warmest as they absorb the rays of the sun and so retain heat.

Red soil is chiefly due to the presence of iron in one or other of its forms. When the texture of the ground is good, the iron compounds will serve to keep the soil

suitably moist and so make for fertility. Brown and yellow soils are usually due to lesser quantities of iron.

Clays which, when cut with the spade, show iridescent shades of purple, blue, and green should be avoided, as these are sure signs of bad drainage and poor aeration, conditions which are disastrous to plant growth.

The Necessary Tools.—The new hand at growing vegetables will probably welcome a few hints regarding the tools he requires for the work. First of all, let us consider *the spade*. This should be of a weight to suit the capacity of the one who has to use it, and to him it should seem neither light nor heavy, but easily manipulated. The length of the wooden arm varies with every spade, and unless a convenient size be selected it will mean much unnecessary backache and other discomforts. The shape of the handle, either D or T shape, matters little, but unless it is well rounded and smoothed it will cause unnecessary blisters and otherwise damage the hands. Of course, a thorough rubbing with fine glass paper may do much towards putting a roughly made article into good condition, but it is just as well to save this bother by getting a serviceable implement at the time of purchase. Then let us look at the rivets which fix the metal to the wooden part. Are they firm and sufficiently stout and does the arm look as though it might snap where they pass through? These are questions the buyer should ask himself. The shoulder of the blade, too, requires attention. If it has a narrow flattened platform or ridge on which the foot of the digger presses it will cause less harm to his boot than if it is innocent of this device.

Obviously the thing to do is to reject a spade without the platform and select one with it. At the time of buying it will be well to get the dealer to put a slight edge on the blade—it should be ground from the back—for this will make digging much easier than if the edge is blunt.

Much that has been said of the spade applies with equal force to *the fork*. Of this implement there are many patterns, the differences lying chiefly in the shape of the prongs. For general work a border fork, as it is described in the catalogues, with four oval prongs, is the most serviceable article. The kinds known as digging forks, though ours will be required for digging, are too unwieldly unless we are possessed of unlimited muscle. A potato fork with flat prongs, though very useful when a great number of tubers have to be dug, is more of a luxury than a necessity.

We must not begrudge paying enough to procure a good article when buying either a fork or a spade, for one, well made, costs less than two, poorly made, and lasts longer.

Both these implements can prove a source of much danger if not carefully handled. During the intervals between use, they should be forced into the soil or placed on the ground so that the edge of the blade or the tips of the prongs are not pointing upwards. When not in use they should be housed where children cannot get to them.

Next comes *the hoe*. Two of these will be required ; one, with the metal face almost at right angles to the handle, is useful for earthing-up, drawing drills, and dragging weeds towards us, and the other, a Dutch hoe, which is worked with a pushing action, serves for uproot-

ing weeds and slicing the surface of the ground. Both must be provided with long handles.

For working the surface of the ground into a fine condition, preparatory to seed sowing, a ten-prong *iron rake* is a useful article. A shorter handle is required for the rake than the hoe.

A hand trowel and fork are necessary for a multitude of purposes. We must select specimens that have the wooden handles firmly fixed and the metal portions in one piece.

Less necessary but yet highly useful is a *wheelbarrow* for carting soil, manure, and produce from one part of the ground to another. The metal varieties are best but more costly and noisy than the wooden ones. Whichever kind is purchased it should not be left standing from day to day in the open. This is an article which allotment-holders might well secure on co-operative lines.

Galvanized zinc *water cans* are far preferable to the painted kinds. They are more expensive, it is true, but last much longer and stand rougher usage. The three-gallon size is probably the most serviceable. The rose must be capable of being unscrewed, for we require it on when watering in the usual way and off when giving supplies of liquid manure.

It is impossible to do without *a guide-line* when planting seedlings or sowing seeds in drills. This useful article may be made at home by cutting off two one-foot lengths from an old broom handle, sharpening an end of each and joining the two by means of twenty feet of stout twine, not rope.

A lath for measuring is also necessary. A long pea-stick, marked off in half feet, will serve admirably.

Dibbers or dibbles become most useful articles in the spring when it is time to put seedlings in their permanent quarters. They cost about a shilling, but one may be made quite easily from the snapped-off handle of an old spade or fork. A child's sand-spade can be converted for use as a dibber in about ten minutes.

A sieve renders very valuable service. If the kitchen article cannot be commandeered when required, we may fasten some fine-meshed wire netting to a stout wooden frame and then fix high sides to the frame. A couple of metal handles screwed to the edges will complete a most useful article.

A knapsack sprayer is needed where potatoes are largely grown. As it is an expensive instrument, allotment-holders might raise a common fund and purchase this and other costly articles with the money, using the equipment in common.

Having obtained the allotment, noted its peculiarities and purchased the necessary tools, the holder's next step is to cultivate the little plot to the utmost of his ability. If he requires information beyond that which is given in the following pages, he should turn to the leaflets issued by the Board of Agriculture and, when a difficulty arises, state his case to the patient Editors of either *The Smallholder*, *Food*, or *Amateur Gardening*.

CHAPTER II

PLANNING THE GROUND

THE plot being made over to you, you will naturally be keen on getting to work, but do not be in too great a hurry. First of all, procure a ball of string, twelve yards long, make knots in it at every yard and fix a little wooden stake at either end. Go down to the holding and measure the plot. Probably it will be a five or ten rod allotment. Five rods is a trifle small, but ten rods will be a good workable size. If it is of the latter dimensions and well proportioned, it will be just about big enough to serve as a tennis court. Take the ball of string and measure the ground; the dimensions of a ten rod plot will probably be twenty by fifteen yards or thereabouts. The first thing is to cut the plot into two and run a path down the middle. Before deciding which way the path is to go, remember that the rows of plants must run as nearly north and south as your plot will allow. Therefore the path, which need only be wide enough to take a wheelbarrow, should go east and west.

Having arranged this little matter, take a sheet of paper, sketch out a rough plan and mark in the path. You now have two strips of land, twenty by seven yards, or fifteen by nine and a half yards, according to which way the path runs. In the following

considerations we will devote our attentions to the twenty by seven sections, this being the more preferable shape.

You must now decide what plants you intend growing. Of course you will want some rhubarb and a few herbs. If there is an odd corner to the ground, reserve it for these useful and necessary articles ; if not, cut off a six foot strip from the regular plot and plant them there when the proper time comes. This little patch is decided upon at the outset as it will remain where it is for many seasons and will not enter into the scheme of rotation which is explained below.

Remembering the potato crisis of the winter of 1916-7 you may feel inclined to plant the whole of your remaining ground with these useful tubers and so get a really good supply. No doubt you would obtain enough to satisfy your wants at the end of this season but you would not be able to grow a satisfactory crop of them next year or the year after, and all allotment holders must look, at least, two years ahead. Nearly every plant, it may be well to state, takes properties out of the soil peculiar to itself ; if you plant potatoes this year, the special requirements of potatoes have almost disappeared from the ground at the end of the first season. The second season, the special requirements are only sufficient to rear a poor crop and in the third year they may be entirely absent, and so you get no crop at all. But the special requirements of other plants are still present in the ground and the soil will be capable of growing good crops of them although it failed you with potatoes. The upshot of all this is that, as a general

rule, it is unwise to plant any particular vegetable on the same piece of ground more often than once in three years. Now as potatoes are a valuable crop, mark off a third of your ground, less the strip for rhubarb and another strip of equal dimensions for a seed bed, and reserve it for this year's tubers. The second third will do for next year, and the last third for the year after next. After that, you will go back to the first third and so continue the rotation. The whole of this year's potato patch may be devoted to main-crops or main-crops and earlies, but, before deciding on this point, you will do well to read the chapter devoted to them later on. Take your plan of the allotment and mark off two yards down one side of the path for rhubarb and twelve yards for potatoes.

Now turn to the strip on the opposite side of the path. Mark off twelve yards and reserve this space for cabbages, cauliflowers, broccoli, and turnips. You have left a strip of six yards by the potatoes and eight yards close to the cabbage patch. Put twelve yards of this down for parsnips, carrots, beetroots and onions, reserving the remaining two yards for a seed bed.

The plot being carefully divided, call the potato section, A ; the long-rooted vegetable section, B ; and the cabbage family section, C. Let us now consider A, B, and C in more detail. A is to be sown with potatoes, but between the rows of main-crops sow also spinach and lettuces. They will be gathered before the potato haulms have grown to any size. B must be shared between parsnips, carrots, beetroots and onions. Give parsnips four yards, carrots three yards, onions three yards, and beetroots two yards. If Jerusalem artichokes

are appreciated, shorten the space for beetroots and plant a few of these along the edge of the plot. C is reserved for cabbages, cauliflowers, broccoli, and turnips. Give cabbages five yards, cauliflowers two yards, broccoli three yards, and turnips two yards. No space has yet been found for beans and peas. Steal a narrow strip of ground all along the north or western edge of the plot and raise these leguminosæ there.

Keep a copy of the plan you have drawn up so that next year you will know exactly how to arrange the second season's crops. Where A comes this year, next year it will be B and the year following C. Similarly B becomes C and A in the two ensuing seasons and C changes to A and B. The bean and pea plot will remain in the same situation, but it is well to dig in a good deal of fresh soil each year.

These are the broad lines on which you must arrange your cropping. It is a scientific but somewhat wasteful method which in these days of scarcity may be departed from on occasions. For instance, sow lettuces between parsnips as the latter are slow growing ; put broad beans between rows of potatoes ; fill up the plot cleared of potatoes or onions with broccoli, Brussels sprouts, borecole, etc. ; plant vegetable marrows where the seedlings have gone from the seed bed ; grow leeks on a disused broad bean bed ; sow winter spinach after turnips ; plant endives after shallots and celery after spring cabbages. Keep the ground always as fully occupied as possible.

A careful system of rotation is of no avail unless it be supplemented with suitable manuring. Each year, dig plot A as deeply as the soil will allow and incorporate, in

the previous autumn, some stable manure; dig plot B, but, as carrots, parsnips, etc. do not appreciate manure, withhold it; and dig C as deeply as the soil will permit and incorporate large quantities of stable manure and vegetable refuse.

CHAPTER III

PREPARING THE SOIL

THE soil is composed of countless microscopic particles which are separated one from another by equally microscopic spaces of moist or dry air. Day by day the tendency is for these particles to settle down, to become closer to each other, and, in the process, to drive out, more and more, the intervening air compartments. Now air, especially moist air, is a necessary factor for plant growth ; therefore, as the soil settles, it gradually loses its capacity for producing crops.

In order to restore this constant loss, digging and trenching is resorted to. Digging, we are frequently told, should be performed to a good depth, but unless this little piece of advice be supplemented with common sense, it will lead to more harm than good. What, then, is the rule which should be observed ? On no account should the subsoil be brought to the surface and the surface soil buried below the subsoil. The former has been cultivated, contains humus and is, probably, in a fair condition of friability, but the latter has been hidden from the sun and air through countless ages and, more than likely, possesses little in the way of plant food.

If the layer above the subsoil is deep, that is, three or more feet in depth, there will be little need to interfere with the subsoil itself, but in many gardens and allot-

ments it will not reach down a foot. When such is the case it will be the duty of the grower to do all in his power to increase the depth of the surface soil. The obvious but most expensive way of doing this is to purchase one or more loads of loam and to spread it all over the ground after the latter has been dug. Where such is out of the question, and it will be on most allotments, the uppermost layers of the subsoil, if of a clay nature, should be well broken up and mixed with vegetable refuse, the least useful grades of animal manure, cinders, and the contents of the dust bin, so long as this does not include tins, broken glass and other unassimilable material. Where the subsoil is sandy, anything that makes for adhesion, such as cow manure, may be worked in with advantage. The effect of this operation will be to increase gradually the depth of the surface soil and to loosen or bind the subsoil as the case may demand.

Draining the Plot.—Before commencing the actual task of digging it will be well to give an eye to the drainage of the land. On most plots the natural filtering away of the water will prove sufficient, but to a piece of ground that is waterlogged, and consequently sour, some attention must be paid. In such a case it will prove advantageous to dig out a fairly deep hole in the lowest point of the plot and to partially fill it with coarse cinders, broken bricks, damaged flower pots, tree branches, old tins, and a few small wooden boxes. When these have been thrown in lightly, the soil is covered over them and the hole filled up. This will probably serve to drain the plot, but where extra

measures are deemed necessary, deep but narrow trenches should be cut leading from various points to the excavation, always, of course, provided with a downward run. The trenches must then be packed with cinders and tins, as mentioned above, and be finally filled over with soil. These arrangements will take some little time to carry out and will prove an arduous business, but the land so treated becomes sweeter, better aerated and far more fertile.

Digging the Plot.—Let us now turn to the digging operations. We take our implements to the cabbage patch or, as it was designated in the previous chapter, plot C. This patch must be dug deeply and well manured. The best thing to do is to turn it over in the late autumn, repeating the work before sowing or planting time. If this is impossible, it should be dug in late December only.

According to whether we intend digging the plot once or twice so must our work be regulated. Plate 2 (Figs. 1—4) illustrates the process of double digging. Each figure shows three layers of soil: the surface soil, the second or under spit, and the subsoil. Go to one end of the plot—the lower if the ground be not level—and dig out a trench two feet wide and two spits deep (Fig. 1). Cart the removed soil to the far end of the plot. Fork B and C and mix them well with a plentiful supply of manure. Then transfer the portion of soil marked D in Fig. 1 to its position in Fig. 2—and give it manure—following this by the removal of portion E in Fig. 2 to its position in Fig. 3. From this, it will be seen that as the work proceeds, the second spit comes to

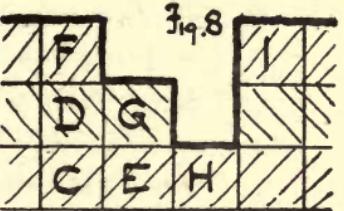
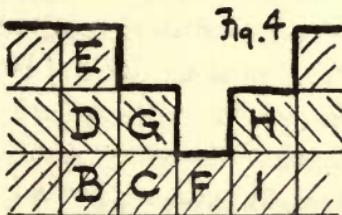
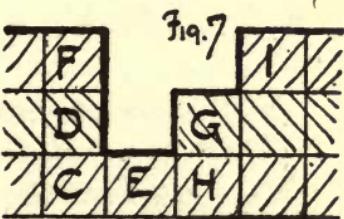
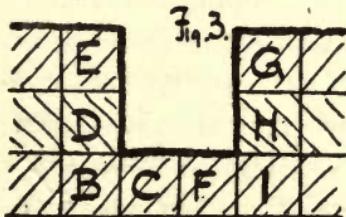
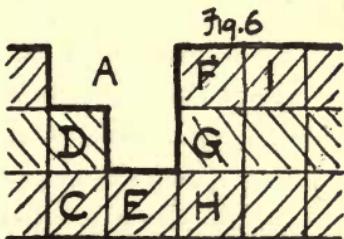
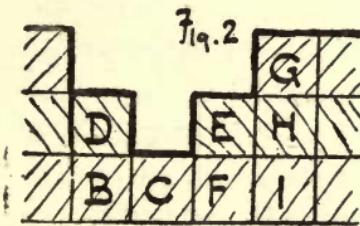
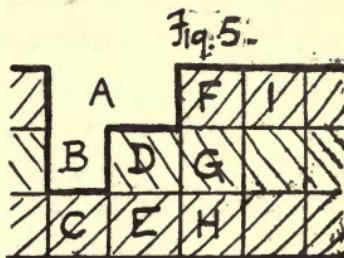
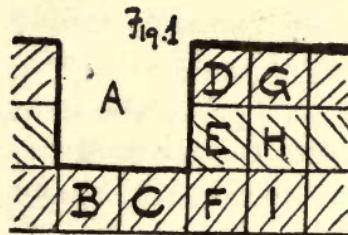


PLATE 2.—Methods of Digging.

the surface, the surface soil, after being manured, goes to the second spit and each portion of the subsoil is forked and manured as it is uncovered. Immediately after this late autumn digging, the ground is steeply ridged to present as great a surface to the frosts as possible (Plate 3, Fig. 4), and then, in spring, is dug again but not necessarily manured. The second digging will proceed on the lines of the first, and in this way the two upper layers of soil return to their original positions. When time permits of only one digging, we must follow the instructions pictured in Figs. 5 to 8. Dig out trench AB and fork and manure portion C (Fig. 5). Then transfer portion D from its position in Fig. 5 to that shown in Fig. 6, and add manure. Now fork and manure E, also transfer F, as shown in Fig. 6, to its position in Fig. 7, and turn over G from where it stands in Fig. 7 to its position in Fig. 8. Proceeding along these lines, we turn over the two top layers of soil, keeping them in their respective positions and, at the same time, the subsoil is forked and manured. Ridging follows as before and, when the surface is hard with a spell of frost, plot C must be well limed.

When this portion has been attended to, we turn to plot A and treat as before but add no lime. Plot B is finally dealt with, being dug lightly on the surface, with no manure added. We must remember that the lettering of these plots changes from year to year so that all the portions of the allotment receive their due share of attention in the course of three years.

Never dig the ground over when covered with frost or snow ; to turn in cold material may retard the sowing time by weeks. Never walk unnecessarily on the surface

when it is wet ; treading consolidates the soil and closes up the air spaces. Other things being equal, dig heavy soils as long as possible before sowing, but sandy soils as near to sowing time as convenient. Force the spade or fork vertically into the soil ; a slanting cut will make for shallower working (see Plate 3, Figs. 1 and 2). Let the ground stand uncropped as little as possible, for uncovered soil is apt to have its supply of nitrates washed away.

Sowing.—When the ground is sufficiently warm for the reception of the seeds, the surface should be raked and smoothed down. All lumps and stones should then be cleared away and a fine crumbling state of the earth provided. Do not, however, work the surface into a powder, for when a shower comes and the sun follows, a hard tough skin will be formed which no seedling will have the power to force its way through. If lumps are left, it is quite impossible to sow finely and in straight lines, and more important still, the seeds can never be surrounded by soil as they should be. Between the lumps the interstices will catch the moisture and probably rot the delicate growths. Moisture, however, is necessary to promote germination, but the old jingle is worth remembering : “Sow in dry and plant in wet is a golden rule you should never forget.” In most cases, it is advisable to sow in drills or lines, using a length of twine to serve as a guide ; broad casting is a wasteful method which should be seldom adopted. At present there is a shortage of seed as well as an increased demand, so it is imperative that no waste be permitted. Penny packets of many varieties will provide quantities sufficient for most

allotment holders and those who devote themselves to gardens. To buy larger quantities is therefore wasteful and even unpatriotic.

When sowing do not trample on the ground, but provide yourself with a plank and stand on that (Plate 3, Fig. 5). As a row is completed press it slightly with another plank in order that the seeds may be nicely tucked up in their beds. If birds are troublesome, and they will be where lettuces, peas, beans, and onions are concerned, you must thread the rows with cotton in some such way as suggested in Plate 3, Figs. 7 and 8. The wary old starlings which sit on adjacent trees, watching you insert your beans and other seed, will then be hindered in their endeavours to secure a free meal. Sometimes you will find it necessary to make a sowing in pans or pots under glass. When so doing (1) provide sufficient drainage; (2) use a sandy loam; (3) some well-rotted manure will prove beneficial; (4) press the surface after sprinkling the seed; (5) give frequent supplies of water of a mild temperature; (6) and do not forget that air is necessary for growth (see Plate 5, Figs. 1 and 2). Much other matter dealing with the operation of sowing will be found tabulated at the end of this book.

Treatment of Seedlings.—It is highly imperative that the frail and delicate nature of seedlings be recognised. First of all they must be given adequate but not excessive supplies of water in dry weather. However, it is the simplest thing in the world to abuse the water-pot, for by undue supplies of liquid the roots become drawn to the surface and lose the power of searching

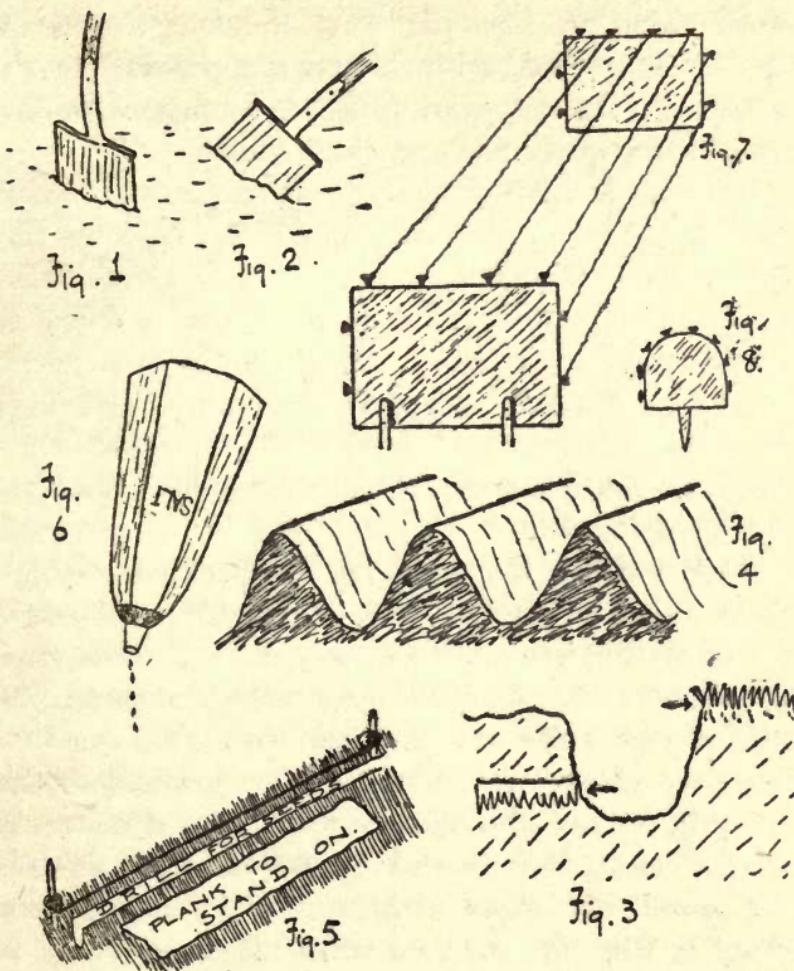


PLATE 3.—Hints on Digging and Sowing. Force the spade into the ground as shown in Fig. 1. Fig. 2 will not provide for a sufficiently deep cut. When digging turf land bury the sods, as indicated by the arrows in Fig. 3. Throw up all ground that is standing idle during the winter in ridges (Fig. 4). When sowing stand on a plank and do not walk on the soft earth (Fig. 5). Sow fine seed as suggested in Fig. 6. Figs. 7 and 8 show ways of protecting seeds and seedlings from the ravages of birds.

deep down in the soil for their own requirements. Too much water, also, has the effect of caking the surface skin of the ground and making it non-porous. Lastly, watering in the early part of the season may reduce the temperature of the soil and check growth.

Thinning is another matter that requires attention. This should be done as early as possible after the tiny plants show themselves. Aim at two things when performing the work. Try to leave the seedlings an even distance apart, and, as far as possible, pull out the straggling, twisted, unhealthy specimens, preserving those that are erect and robust. Do the work after a shower or watering and be careful to press the soil around the remaining crop.

When transplanting seedlings, lift them with as big a ball of soil as you can (see Plate 5, Fig. 10); if the earth is crumbly and falls away use the water-can on the seed-bed about a quarter of an hour prior to transference. Do not plunge the roots in a hole that is too small for them, but allow plenty of room. Most plants do better when the surface immediately around the stem is concaved (Plate 5, Fig. 8); this dip conserves the moisture and permits of a slight earthing up of the stem later on (Plate 5, Fig. 9). Autumn crops which are likely to remain in the ground during frosty weather should be planted in V-shaped trenches; this affords them much protection against the inclemencies which are sure to follow.

In hot weather, when transplanted seedlings are liable to flag before they have become established, some form of protection must be given. Make two long skeleton frames, say six by one foot, nail some calico over them

and hinge the long sides together. Stand this contrivance over a row of seedlings which has just been put into the ground whenever the sun is strong enough to produce flagging (Plate 5, Fig. 3).

Hoeing.—The value of constant and repeated hoeings can only be appreciated by those who practise this gentle art. As we have said before, the soil gradually settles down and loses its aeration ; this happens more on the surface than anywhere else. When the hoe is used to scratch, chop or flake the upper layers of the ground, porosity is restored and the plants gain thereby.

Weeds.—Not only is the hoe a valuable tool for increasing the fertility of the soil, but it is, also, the best implement we can use for tearing up shallow-rooted weeds. Give each weed two strokes with the hoe, one to sever the leaves from the root, the other to damage the root itself.

Weeds are often left in the ground to increase and multiply at their own will. This is a most short-sighted policy, as where one of these useless plants is grown something of value might be thriving. In a general way weeds absorb moisture and take up plant food ; they crowd the crop, screening it from the light ; they often harbour insect pests which, in time, infest the vegetable crops ; and frequently they taint the flavour of our produce.

The following methods of suppressing these undesirable encumbrances of the ground are suggested by the Board of Agriculture :—

1. The most obvious mode of suppressing weeds is to prevent their seeding. When it is recognised that an ordinary charlock plant produces more than

a thousand, and a moderate-sized poppy at least ten to fifteen thousand seeds, the force of the adage that "one year's seeding is seven years' weeding" is obvious. Further, as many weeds produce seeds which do not germinate uniformly, the mischief is greater than at first sight appears, for they may lie dormant in the soil and come up subsequently at inconvenient times. The prevention of seeding should extend to weeds growing in hedgerows, and on roadsides and waste places, etc.

2. Deep digging is sometimes resorted to with considerable success, many weeds rotting when deeply buried. Others, however, remain dormant under such conditions, without losing their vitality, and may subsequently be brought to the surface. Shallow cultivation and the preparation of a good tilth are more advisable, as by this means the seeds are encouraged to germinate, when they may be destroyed by further stirring the soil. Such a method, taking care to keep the seeds near the surface, will clear the ground of many annual and biennial weeds, such as poppy, charlock, and some species of thistle.

3. The eradication of perennials, such as couch, bindweed, and creeping-thistle, needs careful and well-directed effort. These plants are propagated by underground runners bearing buds, and the best treatment where they are concerned is shallow ploughing and thorough cultivation, the weeds being collected and burnt. Or the weeds may be brought to the surface and left to the drying effects of wind and sun.

4. Hand-pulling and total removal of weeds is the most efficient means of destruction and one that may be

practised where the area of land under cultivation is not great.

5. Judicious cutting with spade, hoe, or scythe will destroy all weeds, but ill-timed cutting only encourages what it is desired to suppress. Many weeds when cut near the ground send up new stems, and these are produced at the expense of food stored below the ground in the previous season. The growth of these secondary stems weakens the plant as a whole, and if, when produced, they are immediately cut off, and the process repeated, total destruction will be the result, no matter what the plant may be.

The first cutting should be early in the year, and as often after that, throughout the summer, as new shoots appear. If left too long they may either seed, or again store up food in the roots in preparation for the next season's growth. One cutting in the case of perennials is quite valueless.

CHAPTER IV

TOWN ALLOTMENTS

SINCE the spread of the allotment movement, plots have come into being in all sorts of unlikely places, but of the hundreds, perhaps thousands, which we have seen in the last twelve months those that have sprung up amidst the bricks and mortar of congested towns are probably the most difficult and heart-breaking to bring to a successful issue. As there are many plots situated in surroundings such as we have mentioned, and as the people who work them are usually more heroic than skilled, a few hints may be specially given for their benefit.

Lack of proper soil and want of pure air are the two chief factors which the town grower must try to fight. Without sufficient soil nothing can, of course, grow and when all the tins and other refuse have been cleared from a site there has often been precious little left in which to rear things. But some soil always remains after the rubbish has been cleared, and if this is well worked up with a cartload or two of good road sweepings the land will soon begin to show its worth, especially if the subsoil was first well broken up but not brought to the surface. In and around London the plots are usually of a clayey nature and can be materially benefited by a

dressing of lime or the addition of a cartload of chalky soil, but the lime must not come into immediate contact with the manure of the road sweepings or the ammonia in the latter will be driven off. Put them on the land a month apart or more, if convenient. Such a plot should be dug as early in the year as possible in order that it may become friable and in good condition by sowing time. All the rules laid down for proper cultivation in earlier and later chapters should be carefully observed so that skill may atone for initial drawbacks. And, as the depth of the soil is slight and the roots will find little inducement to burrow deeply, a good deal of watering will be necessary. Of course, much will depend on the judicious selection of the seeds. Always choose those that are known to do well in shallow places; *i.e.*, sow globe beetrots rather than the long-rooted varieties, give preference to stump-rooted carrots over the long kinds, and pick one of the kohl-rabis, the bulb of which grows entirely out of the ground, instead of long turnips.

The lack of pure air is perhaps a harder thing to fight than a deficiency of soil. In such plots as we have here in mind the young seedlings often come along full of promise, but before maturity is reached their pores become clogged with soot and dust and they die away. All that the grower can do is to rear hardy stock which is known to mature quickly. If, for instance, he sows in gentle heat, transplants to a cold frame, and then beds out, the crop will stand a far better chance of being a good one than if the seeds are sown in the ground in the first place. It will have a better start and be ready for gathering some weeks earlier, every day of which period means fewer clogged breathing pores. Of course, proper atten-

tion to artificial feeding helps to quicken a crop, so this should be practised with those vegetables which admit of it. Some workers cover up their vegetables, such as cabbages, with paper bags, in which tiny holes have been drilled, when fogs and frosts are feared. This simple form of protection saves many heads of produce when the bad weather begins to set in.

Some crops should not be attempted at all, either because of their sensitive nature or their long period of growth. Cauliflowers, for instance, are fairly sensitive and are of little value except when quite clean, consequently they will not do well unless grown in good weather and enveloped in bags, as suggested above. Broccoli and Brussels sprouts take too long to grow and are damaged before full maturity is reached. Spring cabbages will thrive well enough, but the autumn and winter varieties need coddling to get through the inclement weather, but they can be pulled through with care. Savoys are a safe crop, but turnips are not satisfactory.

Runner beans prove a great success, and the grower should plant as many of these as he can sow around the walls, fences, etc. Peas are less prolific, but well worth attempting, though it is wise to remember that, even under good conditions, a foot of ground given up to beans produces more edible matter than an equal space devoted to peas. Broad beans are apt to bring forth a crop of black fly but few beans, and are hardly worth attempting. Onions are usually successful, especially if small and medium-sized bulbs are appreciated. Leeks do well as a winter crop, perhaps because they thrive on soot. Lettuces, if grown quickly in spring and summer, give ample satisfaction, and the same may be

said of radishes. Where a few frames can be had, good tomato plants may be reared. Potatoes are a doubtful crop. We have seen fair yields with early and second early varieties, but main-crops are less satisfactory.

The town allotment-holder must guard against sparrows and mice. The former will ruin his beetroots and lettuces unless he scares them away by means of dangling scarecrows or keeps them off his produce by threading a number of cotton strands along the rows. The mice will dig up the peas and beans as soon as they are set, but not if rolled in red lead, which is a dangerous poison needing careful storage. Phosphorus paste spread on little pieces of meat or cheese will kill the vermin but will also injure cats or dogs, and even children, and, therefore, cannot be recommended. Traps should be used instead.

CHAPTER V

MANURES

FOR proper growth every plant requires the following ten foods, viz. :—

Oxygen, hydrogen, carbon, nitrogen, potash, phosphoric acid, lime, magnesia, iron, and sulphuric acid. (Three additional foods may be mentioned, but they possess little interest for those who grow on allotments and in vegetable gardens; they are silica, chlorine, and sodium.)

Of these ten ingredients, the first three are derived by the plant from the air and from the water drawn in by the root system.

The fourth, nitrogen, is obtained partly from the air and partly from the soil.

The fifth, sixth, and seventh, *i.e.*, potash, phosphoric acid, and lime, are taken from the soil, but are generally found there in insufficient quantities for producing abundant crops.

The last three, magnesia, iron and sulphuric acid, also come from the soil, but they occur abundantly.

From this summary, it will be noted that the first and last group of foods need not trouble the vegetable grower as they are always obtainable under natural conditions. With the two middle classes, however, that is to say, nitrogen, potash, phosphoric acid, and lime,

conditions are different. They are constantly being used up either by plant growth or by climatic processes, and, therefore, if we desire to produce satisfactory crops it must be our first care to make up from time to time whatever deficiency arises. This business when performed rationally, that is to say, when due regard has been taken of the need of the particular soil and the special requirements of the crop to be grown on it, may be called the science of manuring.

Many growers are somewhat averse to thinking scientifically when dealing with their plots and crops. They know that manure is a good thing for growing plants and, accordingly, they distribute manure along the drills or trenches. Their fathers did so and so did their forefathers, and they will follow their footsteps. Were they to spend a moment or two in deciding the qualities of their particular soil and in noting the varying requirements of the crops to be grown, not only would they effect a great saving in manures, but they would also raise crops which, having been better satisfied, would give far finer yields.

First of all, then, the grower must get some idea of the quality of his land. In made-up gardens, this will be rather difficult, for the soil will have been usually imported. Still its qualities can be noted and a fair impression gained. With allotment holdings, however, the land will be usually the natural soil of the district and its constituency can then be ascertained fairly correctly.

To assist in arriving at some useful conclusion, we may say that, in a general way, most sandy soils lack

nitrogen, potash, and lime. The green sand of Kent, Surrey, Bedfordshire, and Cambridgeshire contains, however, an abundance of potash. The Bagshot sands of Essex, Surrey, and South Hampshire are deficient in phosphates; in fact, few parts of the country stand in need of more scientific manuring than these. The dark red sands and loams of Cornwall, Devon, Somerset, Hereford, Monmouth, parts of South Wales and parts of the Scottish border are well supplied with phosphates and often with nitrogen, but they lack potash and lime. The lighter red sands of Lincolnshire, Nottinghamshire, Warwickshire, Shropshire, and Cheshire are always in need of strong dressings of lime and often of potash. Chalk soils contain a sufficiency of phosphates and lime, but are lacking in potash and nitrogen. Clay soils are the reverse of chalk soils, being poor in phosphates, rich in potash, and fairly well supplied with nitrogen, though the latter, owing to the cold nature of the ground, is seldom available for plant growth until late in the season. Certain clays are very deficient in lime, particularly those in South-east Essex, Mid-Kent, South Hampshire, West Devon, Cornwall, the shaley clays of North and South Wales, those on the coal measures in Lancashire, South-west Yorkshire, Northumberland, and Durham. Clays usually containing plenty of lime are found in East Yorkshire, Lincolnshire, Nottinghamshire, Leicestershire, Northamptonshire, Oxfordshire, Gloucestershire, and parts of Somerset and Devon. The boulder-drift clays capping the hills of Norfolk, Suffolk, Essex, and Cambridgeshire are usually adequately supplied with lime. The fen soils contain almost all the food requirements of plants, but nitrogen is found in

excess and lime is somewhat deficient. Finally, where loams and mixed soils exist, their qualities vary according to whether the clay, sand, or chalk predominates.*

With this rough but useful sketch of the soil values of the greater part of our country, it should be possible for the grower to form a useful opinion of his own particular plot. If he concludes that it lacks one form of food, it will be his duty to supply it, but if it is rich in another he will not waste his time and money in adding to its richness.

Having decided in what essentials our land is deficient, the next matter is to find which manure will provide it with the ingredients lacking and at the same time give to the crops which we have decided to grow the special foods they need.

In order to be able to do this a knowledge of the composition and peculiarity of each manure is necessary. The following notes will prove a helpful guide :—

Farmyard Manure is a good all-round manure for giving a new lease of life to ground that has been much cropped. It contains a high percentage of nitrogen and much potash and phosphates. It not only enriches the soil with these necessary ingredients, but has a mechanical effect as well, for it makes ground more workable, keeps it moist and adds humus. Horse manure breaks up heavy soils, makes them more porous and better aerated, whilst sheep and cow manure do better on light soils, making them more retentive. Again, horse and sheep manure is fairly dry, but cow and pig manure is wet, a fact which makes the former very

* W. M. Tod in "The Farmer and Stockbreeder Year Book," 1910.

suitable for the composition of hot-beds and all systems of forcing. When kept for a considerable while horse manure is valuable for potting if mixed with good loam. Farmyard manures are usually dug into the ground in autumn and winter.

Fowl and Pigeon Manures are a great deal stronger than the above, with much the same constituency, *i.e.*, they are rich in nitrogen, potash and phosphates. Two pounds of the former and one of the latter will prove a good general food for each square yard of the allotment or garden. They must not be used in the green state, but kept, preferably for some months, in a dry condition in boxes mixed with dry soil.

Night Soil is a useful manure of much strength. It contains a high percentage of phosphates with ample lime and potash. If mixed with lime it need not be dug into the ground for some weeks, but winter is the correct time for using. It is chiefly valuable for vegetables which grow to a considerable size.

Fish Manure is rich in phosphates, but contains a considerable percentage of lime and nitrogen. If used in an unprepared state, it must be dug into the ground with no loss of time on account of the unpleasant smell. Sandy soils derive most benefit from its use, especially if applied in winter.

Dried Blood is a good nitrogenous manure, but usually difficult to obtain and store. It should be used sparingly, say two ounces to the square yard, and applied in the growing season.

Seaweed is an almost complete manure, and therefore of the greatest value. It is especially rich in potash, with fair proportions of nitrogen and phosphates.

Potatoes and beetroots thrive extremely well when treated with it.

Liquid Excreta are extremely rich in nitrogenous matter and, therefore, are of much value if applied sparingly and well diluted. They are best after storing—three weeks at the very least, six weeks for preference—especially when a small quantity of sulphuric acid is added to fix the ammonia. Growing crops of the brassica family thrive well when fed with this form of manure.

Bones contain an extremely high percentage of phosphates and are, in consequence, a most useful food for plants. In the uncrushed state, however, they take many years before being assimilated, a drawback which does not apply to bone flour. The steamed varieties of the flour have been deprived of the fatty substances and are far more attractive in consequence. Dissolved bones are supplied in a commercial form. This manure contains a slightly lower percentage of phosphates than the steamed bone flour; it is also of an acid nature, and, therefore, must not be used on land lacking lime.

Basic Slag is a phosphatic manure derived from transforming pig iron into steel. Its influence on soils is somewhat erratic, but we may safely say that on most lowlands it is highly useful though of little value on dry uplands. As a dressing where club root disease is feared it is most beneficial, but must be withheld from land treated with sulphate of ammonia.

Superphosphate was a cheap and extremely valuable phosphatic, quick acting manure which formed an autumn or spring dressing. Since the War it has been somewhat difficult to obtain.

Kainit and Muriate of Potash are potassic manures which were obtained chiefly from Germany. Accordingly, they are at present extremely scarce.

Sulphate of Ammonia is a cheap nitrogenous manure which is a by-product of coal gas. Applications should be given to the ground either shortly before sowing or whilst the crops are growing. It is easily obtained at the present time and is, therefore, taking the place of nitrate of soda, which is almost un procurable.

Lime may be obtained in various forms, *i.e.*, quicklime, ground lime, slaked lime, ground limestone and gas lime. It is a valuable ingredient, being not only a plant food, an insecticide, and a soil sweetener, but has the power of acting on organic matter already in the ground, forcing it to decay and so providing quantities of plant food which, though present in the soil, were unassimilable. Lime also has the power of breaking up stiff land and giving it warmth and a better drainage; it liberates potash from clay; it gives binding qualities to sand and thus enables it to retain manures far more satisfactorily. Clearly lime is one of the most valuable chemicals which the grower can give to his lands, but it must be used with caution. Never put it into intimate contact with animal manures or it will drive off the ammonia; use it sparingly for potatoes or scab will appear, and keep it away from tender root stocks. As a rule, the ordinary forms should be used as a top dressing about fourteen days before the final digging, but gas lime, which is a most powerful insecticide, should be on the ground six months before planting time.

Soot, when collected from household flues and kept for a fortnight is a very useful manure, being fairly rich

in nitrogen. Its chief properties, however, are (1) a strong insecticide, and (2) a warmth-giver to cold ground. The latter property is due to its great power of absorbing the sun's rays. Every particle of this material should be collected periodically, carefully stored in a dry shed, and used as required. It may be given as a dressing to land just as the crops are coming through or placed in little rings close around plants to which slugs are very attentive. Soot water, made by soaking a peck of soot in forty gallons of water for a fortnight, is a nourishing food for growing crops.

Salt may be used with beneficial results where it is desired to liberate potash and lime from the soil and present it to the plants in an assimilable form. It increases the power of soils to retain moisture, a most valuable property in cases of dry lands. As an insecticide its qualities are obvious. Peas and beans are much benefited by its use.

Ash is good if applied with care. Coal ash serves to break up heavy soils and is thus most beneficial, but the sulphur contained by it is harmful, injuring young plant growths and neutralising the effects of lime. Wood ash, the residue of the autumn bonfire, is highly valuable, especially just now, as it is rich in potash. It should be collected, stored in dry tins, and applied during the spring and summer.

Vegetable Refuse, *i.e.*, the leaves collected in the autumn, especially oak leaves, the refuse from cabbage and similar plants, hedge clippings, the grass thrown out of the mowing box, and all such matter is highly useful and should be preserved in a pit or cage. Every fortnight, whilst additions are being made to its bulk, a few

handfuls of salt should be sprinkled on the surface and then the whole mass turned with a fork, in order that complete rotting may be effected. This manure is rich in nitrogen ; it may be used for digging into the trenches ; for mixing with stable manure to form a hot-bed ; or when completely rotted, for potting.

Green Manuring is a cheap and valuable way of restoring to overworked or poor ground the nourishment so necessary for producing abundant crops. Instead of purchasing farmyard manure or any of the artificials which to-day are somewhat expensive, we sow one of the following (the quantities are per square rod) : On heavy and medium soils, Red Clover, 2 ozs. ; Lucerne Alfalfa, 3 ozs. ; Spring Vetches (from February to June), $\frac{3}{4}$ pint ; Winter Vetches (from September to February), 1 pint.

On light, sandy soils, Lupins (blue), $\frac{1}{2}$ pint ; Red Clover, 2 ozs. ; Lucerne Alfalfa, 3 ozs.

The above will provide almost unlimited supplies of nitrogenous matter. If we desire to increase the humus in the soil, we sow—

On heavy and medium soils, Giant Rape, 1 oz. ; White Mustard, 2 ozs.

On light, sandy soils, Buckwheat, $\frac{1}{2}$ pint.

Some of the above seed are not easily procurable, but supplies are available at the Eastern Counties Farmers' Co-operative Association of Ipswich.

Green manuring (1) improves the mechanical condition of both light and heavy soils ; (2) the surface of the land is given a protective covering during the worst months of the year ; we should note that bare soil loses nitrates and lime, but covered soil does not in anything

like the same degree ; (3) weeds are stifled and killed ; and (4) the root stocks of the green crop burrow deep into the ground, break up the subsoil and make way for our real crops.

There is no necessity to dig the land before thickly sowing the above seed, but when it has grown and the land is required for vegetables, the surface is well turned and the green matter dug in.

Not only must the grower who wishes to proceed on scientific lines consider the value of the various manures at his disposal in connection with the composition of the land, but he must also bear in mind that some manures tend to assist the spread of certain diseases whilst others operate as checks to them. Accordingly, if such diseases are likely to occur, he will have to regulate his manuring accordingly. For instance, acid manures, though valuable in themselves, are amicable to the spread of club-root. We must, therefore, withhold dissolved bones, superphosphate, sulphate of ammonia if this dread complaint is prevalent and use basic slag or steamed bone flour instead. Again, where diseases occur through the land degenerating into a sour condition, lime must be used freely as a dressing. And where blight is troublesome the potato crops must be fed liberally with potash in order to make them robust and more immune.

Lastly, we may point out that artificial manures should not be placed together in a haphazard way. Sulphate of ammonia must not be mixed with a manure holding free lime, notably basic slag and precipitated phosphate. The immediate result of making such a mixture is the liberation of free ammonia. If it is

desired to apply sulphate of ammonia with one of these substances to any particular area, the phosphate should be put on a month or more before the other substance. Sulphate of ammonia may, however, be mixed with the other ordinary manures, such as superphosphate, dissolved bones, bone meal, kainit, sulphate and muriate of potash, and nitrate of soda. Nitrate of soda should not be mixed with superphosphate, dissolved bones, or dissolved guano. Not only may such a mixture result in the loss of nitrogen, but the mass is apt to become sticky and difficult to sow. Superphosphate and dissolved bones should not be mixed with basic slag or precipitated phosphate, as this results in the soluble phosphate of the superphosphate or dissolved bones becoming insoluble.

Potash manures (kainit and sulphate or muriate of potash) should not be mixed for more than a few hours with any "dissolved" manure (*e.g.*, superphosphate and dissolved bones), not because anything is lost, but because the mass is apt to become smeary and unsowable.

The last two paragraphs are quoted from a Board of Agriculture Leaflet. Other matter bearing on the subject of manures and manuring and published by the Board which the grower should study is : "The Purchase of Artificial Manures;" Leaflet 72, eleven pages. "The use of Artificial Manures;" Leaflet 80, twelve pages. "Farmyard Manure;" Leaflet 93, seven pages. "Fertilisers for Market Garden Crops;" Leaflet 106, eight pages. "The Uses of Lime;" Leaflet 170, six pages. "The Use of Waste Organic Substances as Manures;" Leaflet 175, seven pages.

CHAPTER VI

HOTBEDS AND COLD FRAMES

THE value of a hotbed can hardly be over-estimated as, with its assistance, we may raise all sorts of seedlings and thereby save much money and economise precious time, also, should we feel disposed, we may rear on it quite a large number of limited crops out of season, when they are scarce and expensive. But, as with all things that possess such obvious attractions, the hotbed has its limitations. If you can only devote your Saturday afternoons and a chance evening or two during the week to garden work, then the hotbed is not for you. It must have care lavished on it night and morning and frequently at mid-day. Perhaps you can attend to it before and after business, then enlist the sympathies of the housewife, talk to her romantically about the tender young carrots and crisp little lettuces you mean to rear and she will willingly fulfil your instructions while you are away from home.

The hotbed is a very primitive way of growing with the aid of heat, but it still holds its own against warmed greenhouses, which are too apt to produce leggy plants by the aid of greedy and every devouring coke furnaces.

The first thing to do if you mean to construct a hotbed is to go to a local housebreaker who has a stock of old window frame. Pick out one that is strong without

being heavy, with three long panes or six square ones; carry it home and repair the panes, if any are broken, and put as much fresh putty into the beadings as is necessary to make them watertight. If you care to give it a coat of white paint, both top-side and under-side, so much the better.

The next step is to construct a wooden frame to fit around the window. The latter, we should remember, must tilt forwards both to run off water and to catch the oblique rays of the sun. Therefore, make the frame a foot deep at the front, eighteen inches at the back, and sides to accommodate the slope. Put four stout legs, one at each corner, and make them run down about twelve inches below the lower edge of the frame. Around the upper edge of the frame put a flange of wood to support the window.

Having completed the frame, the bed must now be constructed. About two cartloads of fresh stable manure, containing a fair proportion of long straw will be necessary. Heap it up close to a wall or other form of shelter where the coldest winds will be cut off, but see that the site is not near to your own or someone else's dwelling-house. Once every two days during the course of a week the material should be well turned and shaken. If any leaves are handy, work them into the mass, for they will make the heat more equable and lasting. When undue dryness is observed in the heap, add water sparingly.

The manure being well mixed, the bed may be laid out. With a prong of the fork, scratch on the ground a rectangle two feet longer each way than the wooden frame. Then place little mounds of manure along the sides of the rectangle and push the straggling pieces of

straw inwards ; they will help to bind the mass. The outside edge being banked, the interior is levelled up. This done, the edge is again turned to and banked higher and the interior again levelled. Between each layer the mound is beaten down sufficiently to make the whole fairly clinging. When all the manure has been used, rake out the loose pieces from the sides, scrape up any portions that have fallen on the ground and place them on the top of the heap.

Without loss of time, place the frame on the mound and force the legs into position, but do not let them break away the sides of the heap. Rest the window or light on its beading, prop it open an inch or more and leave for three days.

At first, the temperature in the frame will rise to 70° or perhaps 80°, but on the third day it should fall to about 65°. When this temperature remains constant place a three-inch layer of good loam over the surface of the manure, and the next day the hot-bed will be ready for use.

As to the things which we may grow in this frame a good many suggestions will be made in later chapters dealing with vegetables individually. Here we may describe the raising of a crop of carrots or potatoes out of season.

In December, one of the French forcing varieties of seed, such as *Red Carrot* or *Grelots*, is sown in the frame, thickly. For the first week or ten days the window is kept closed, but as soon as the seedlings show through the soil, it must be opened daily, or as often as the weather permits. If the temperature in the frame falls below 60°, remove some of the manure

which banks up the sides, and replace it by a fresh hot supply. Thin out the carrots when necessary and water constantly, but do not use ordinary water drawn from the tap. Keep a canful in the frame and use that.

Instead of carrots we may grow potatoes, but in this case the soil lying on the manure mound must be at least eight inches deep. The tubers are previously sprouted and treated in accordance with the rules laid down in Chapter XIII. When the haulms grow up to the glass the whole frame should be slightly and frequently raised and extra manure placed around the outside. French growers do not pull up the entire roots when the tubers have reached a fair size. They grope about in the soil with their hands, pulling out the matured specimens, leaving the remainder to grow on.

Whatever the crop, we must do all in our power to preserve a temperature of about 65° within the frame. When frosts are likely or snow may fall, keep the window shut and cover up well with old carpets, which must be weighted down in windy weather. Or if the mid-day sun is a trifle powerful, cover the glass with newspaper in order that the temperature may not mount up and kill the tender plants. On all suitable occasions air must be let into the frame.

Where manure cannot be obtained in ample quantities, an economical hotbed may be made by digging a rectangular pit; placing a window light over it and lining the inside with fermenting material. The earth sides will conserve the heat, and so the need for manure is lessened.

A hotbed is, however, an impossibility with many growers, but all should possess a cold frame. This very

useful article may be made on the lines suggested for the frame which covers the hotbed but, in such a case the long legs which project into the mound of manure should be cut short at the edge of the side planks. Personally, we have derived much service from an old window sash light reposing on a large shallow box which has had the top and bottom removed. Other such makeshifts may be readily constructed by the ingenious reader. In winter it is well to run a low wooden wall all around the improvised frame, a foot away from it. The intervening space is filled in with ashes or compressed leaves. This arrangement will help to keep out frosts and provide much more genial quarters for the growing crops.

Such a frame will help to rear a multitude of young plants at almost any time of the year. It will prove invaluable for hardening off the seedlings in spring, and will serve a useful purpose for completing the growth of all sorts of things that cannot be pushed on to maturity in the open, before the bleak weather sets in, in the late autumn.

Take autumn lettuces, for instance; a good crop of them may have been grown in the open but, at the end of the season, there are about two dozen stray plants scattered about the bed. They are not sufficiently developed for table purposes and if left to their own devices will be speedily killed off. Lift them with a good ball of soil enveloping each root and plant in the frame, allowing plenty of elbow room. Give air daily and water frequently. A nice little supply of matured specimens will be available later.

Perhaps you have some cauliflower seedlings which are deteriorating owing to the autumn gales. Do not place

any stable manure with the soil of the frame but throw in a few handfuls of steamed bone flour and soot and dig them well together. Then plant the cauliflowers about six inches apart. Give them plenty of air and water in genial weather. When frosty, cover the frame with old carpets or matting. Transplant in the open in spring, when a very early supply will be available.

Winter spinach may be sown in the frame and grown there to maturity. Sow in late September or early October in rows about eight inches apart, and cover up with the siftings from an old manure heap. Give plenty of water and as much air as possible ; thin out if required.

Carrots will also do well in the cold frame if sown before mid-October. Choose the stump-rooted varieties and give no manure but a dressing of soot. Keep the bed moist and grow the crop as near the glass as possible.

Many other vegetables, beyond those mentioned here, will readily answer to treatment in cold frames. The above are merely given as typical of what can be grown.

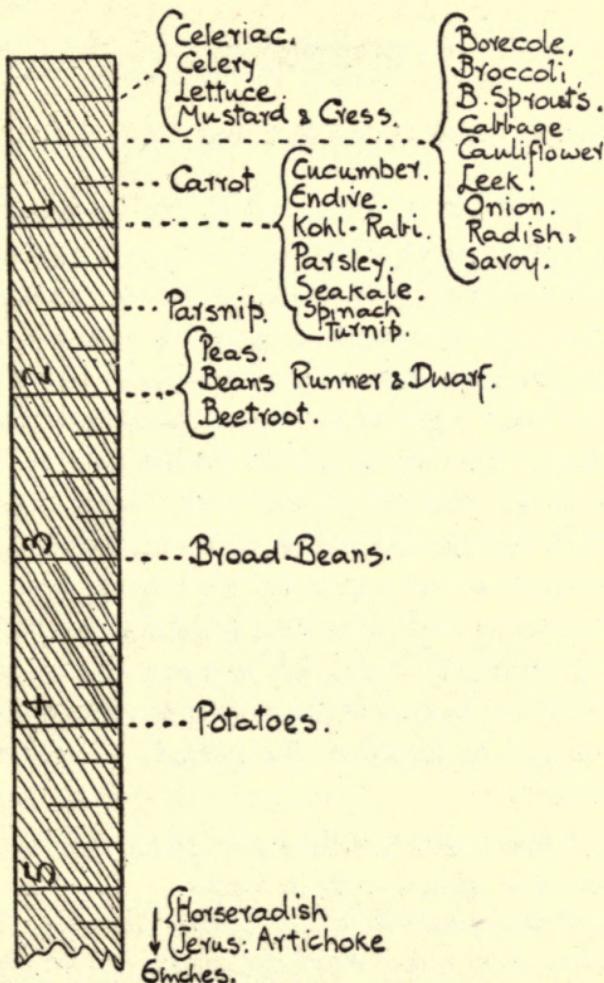


PLATE 4.—Table showing Depth to which Seeds should be Sown.

CHAPTER VII

FRESH VEGETABLES ALL THE YEAR ROUND

ONE of the greatest errors which the beginner makes when he first crops an allotment is to grow a quantity of vegetables which all mature within two or three months of the year. As a consequence, he has a surfeit of fresh food from July to September, or perhaps October, and during the other eight months an unpleasant shortage is experienced. Clearly, it should be his aim to produce supplies all the year round, and with a view to assisting him to this end the list which follows is appended. In the brief space at our command we are only able to give the more usual periods of sowing, planting, and gathering, but, in the chapters which follow many further suggestions are offered to enable the grower to rear produce out of season and so lengthen the periods of gathering as stated below :—

Beans, Broad.—Sow late February, gather June to August. Sow in October, gather early in spring.

Beans, Runner, etc.—Sow May, gather August to October.

Beetroots.—Sow end of April, gather July to October.

Borecole or Kale.—Sow April, plant June, gather December to March.

Broccoli.—Sow April, plant June, gather September to December. Sow later kinds April, plant June, gather January to April. Sow still later kinds May, gather April to June.

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Brussels Sprouts.—Sow January, plant April, or sow April, plant June, gather October to March.

Cabbages.—Sow end of March to July, gather March to December.

Carrots.—Sow early April, gather June to September.

Cauliflowers.—Sow as for Sprouts, gather June to late October.

Celeriac.—Sow March, plant May, gather October.

Celery.—Sow March, plant May, gather October to February.

Chinese Artichokes.—Plant spring, gather October.

Chives.—Sow mid-spring, gather autumn.

Coleworts.—Sow July, plant September, gather winter.

Cucumbers.—Sow late February, plant May, gather July to September.

Endives.—Sow June or July, gather October to January.

Garlic.—Plant March, gather September.

Jerusalem Artichokes.—Plant spring, gather October to January.

Kohl-Rabi.—Sow May, gather August.

Leeks.—Sow February, plant autumn, gather November to February. For small produce, sow March, plant September, gather September to December.

Lettuces.—Sow January to September, plant March onwards, gather all the year round.

Mushrooms.—Plant July to February, gather August to March.

Onions.—Sow early March until late August, gather all the year round.

Parsnips.—Sow end of February, gather October to March.

Peas.—Sow March and April, gather June to October.

Potatoes.—Plant earlies March and April, and gather June. Plant lates in May and gather July to September.

Radishes.—Sow March to May, gather May to July.

Rhubarb.—Plant early spring, gather February to June.

Savoys.—Sow early summer, gather October to February.

Seakale.—Plant May, gather January to April.

Shallots.—Plant February, gather July.

Spinach.—Sow summer kinds in February, gather April to September. Sow winter kinds in early August, gather October to March.

Squashes.—See Vegetable Marrows.

Tomatoes.—Sow January, plant May, gather July to September.

Turnips.—Sow late February, gather June to October.

Turnip Tops.—Sow late February onwards, gather about six weeks after.

Vegetable Marrows.—Sow early April, plant June, gather August and September.

If the above list be dissected, we find that the produce for each month of the year is :—

January.—Savoys, Brussels Sprouts, Broccoli, Borecole, Spinach, Onions, Leeks, Parsnips, Celery, Seakale, Mushrooms, Endives, Lettuces.

February.—Savoys, Brussels Sprouts, Broccoli, Borecole, Spinach, Lettuces, Onions, Leeks, Parsnips, Celery, Seakale, Forced Rhubarb, Mushrooms.

March.—Cabbages, Brussels Sprouts, Broccoli, Borecole, Spinach, Lettuces, Onions, Parsnips, Peas, Seakale, Forced Rhubarb, Mushrooms.

April.—Cabbages, Coleworts, Broccoli, Turnip Tops, Lettuces, Onions, Seakale, Rhubarb.

May.—Cabbages, Coleworts, Turnip Tops, Broad Beans, Lettuces, Onions, Radishes, Rhubarb.

June.—Cabbages, Coleworts, Cauliflowers, Turnips, Turnip Tops, Broad Beans, Peas, early Potatoes, Lettuces, Onions, Carrots, Radishes, Rhubarb.

July.—Cabbages, Cauliflowers, Turnips, Turnip Tops,

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Broad Beans, Peas, Potatoes, Lettuces, Onions, Shallots, Carrots, Radishes, Beetroots, Tomatoes, Cucumbers.

August.—Cabbages, Cauliflowers, Turnips, Turnip Tops, Peas, Beans (all kinds), Potatoes, Lettuces, Onions, Carrots, Beetroots, Kohl-Rabi, Vegetable Marrows, Squashes, Tomatoes, Cucumbers, Mushrooms.

September.—Cabbages, Cauliflowers, Broccoli, Turnips, Turnip Tops, Peas, Runner and Dwarf Beans, Lettuces, Potatoes, Onions, Leeks, Chives, Garlic, Carrots, Beetroots, Kohl-Rabi, Vegetable Marrows, Squashes, Tomatoes, Cucumbers, Mushrooms.

October.—Cabbages, Cauliflowers, Broccoli, Savoys, Brussels Sprouts, Spinach, Turnips, Peas, Runner and Dwarf Beans, Lettuces, Endives, Onions, Leeks, Chives, Parsnips, Beetroots, Celery, Celery, Chinese Artichokes, Mushrooms.

November.—Cabbages, Savoys, Brussels Sprouts, Spinach, Broccoli, Lettuces, Endives, Onions, Leeks, Parsnips, Celery, Mushrooms.

December.—Cabbages, Savoys, Brussels Sprouts, Spinach, Broccoli, Borecole, Lettuces, Endives, Onions, Leeks, Parsnips, Celery, Mushrooms.

Provided with the above tabulations, the beginner should be better able to apportion his crops for the year. Take, for instance, the items which are known at table as second vegetables. In May, the list contains four of them, but eight are given for October. As exactly the same amount of produce will be required for the table in both months it is clear that either larger quantities of each vegetable must be grown for May than October or some of the items figuring on the latter list must not be raised. Of course, the fact must not be overlooked that in winter and early spring we shall have for use the supplies which we stored in the autumn.

CHAPTER VIII

SEED ECONOMIES

DURING the decade prior to the War, Germany sent to this country an incredible quantity of vegetable seeds which found a ready market. When hostilities broke out this supply necessarily and happily ceased, and since then we have had to depend on home-grown stocks and the produce of our allies and neutrals. With the shortened supply has come a greatly increased demand for the thousands of new allotment-holders all require sufficient to crop their land.

As a result of these conditions, it is most imperative that every possible economy in seeds should be practised during the next few seasons. We must reduce to a minimum, for instance, the need for thinning out the young seedlings by much lighter sowings, and, above all, it is a duty to refrain from buying supplies of seeds at random, not knowing whether we have sufficient ground for them or not. In order to assist cultivators in deciding the exact quantity of seed they require, the Food Production Department has drawn up the following useful table :—

Vegetable.	To sow up to.	Quantity of seed required (10 rods).
Beet :		
Long (say 2 rows)	. .	100 feet $\frac{1}{4}$ oz.
Globe (say 2 rows)	. .	100 " $\frac{1}{4}$ "
Spinach (say 2 rows)	. .	100 " $\frac{1}{4}$ "

Vegetable.	To sow up to.	Quantity of seed required (10 rods).
Bean :		
Dwarf (double row) . . .	50 feet	$\frac{1}{4}$ pint
Broad (double row) . . .	50 ,,	$\frac{1}{2}$,,
Runner (double row) . . .	50 ,,	$\frac{1}{2}$,,
Cabbage, etc. :		
For spring use (say 125 plants)	—	$\frac{1}{8}$ oz.
For autumn use (say 125 plants)	—	$\frac{1}{8}$,,
Savoys (say 125 plants) . .	—	$\frac{1}{8}$,,
Broccoli :		
Early variety (say 60 plants) .	—	$\frac{1}{6}$,,
Late variety (say 60 plants) .	—	$\frac{1}{6}$,,
Sprouting (say 125 plants) .	—	$\frac{1}{8}$,,
Brussels Sprouts (say 125 plants)	—	$\frac{1}{8}$,,
Cauliflowers :		
Early variety (say 60 plants) .	—	$\frac{1}{6}$,,
Late variety (say 60 plants) .	—	$\frac{1}{6}$,,
Kale :		
Cottagers (say 125 plants) . .	—	$\frac{1}{8}$,,
Curled (say 125 plants) . .	—	$\frac{1}{8}$,,
Carrot :		
Long	75 ,,	$\frac{1}{8}$,,
Intermediate	75 ,,	$\frac{1}{8}$,,
Celery (say 125 plants) . . .	—	$\frac{1}{2}$,,
Leek	90 ,,	$\frac{1}{8}$,,
Lettuce :		
Cabbage	60 ,,	$\frac{1}{8}$,,
Cos	60 ,,	$\frac{1}{8}$,,
Onion :		
For spring or autumn sowing for harvesting	120 ,,	$\frac{1}{4}$,,
For pulling green or pickling .	45 ,,	$\frac{1}{4}$,,
Parsnip	75 ,,	$\frac{1}{4}$,,
Pea :		
Dwarf (double row) . . .	40 ,,	$\frac{1}{2}$ pint
Taller (double row) . . .	40 ,,	$\frac{1}{2}$,,
Spinach	120 ,,	$\frac{1}{2}$ oz.
Turnip :		
Spring sowing	75 ,,	$\frac{1}{8}$,,
Summer sowing	75 ,,	$\frac{1}{8}$,,
Vegetable Marrow	—	12 seeds

But the careful grower can do more than limit his purchases to the exact quantities required ; he can provide his own supplies by a judicious handling of the previous season's crops. Let us take runner beans, for instance. When the plants have begun to shape in the summer, it is a capital idea to select the most vigorous stems and mark them down for seed and not culinary purposes. Tie labels or little bows of red cloth here and there on them to serve as a distinguishing mark from the others, and leave them all through the summer and early autumn. The smallest beans on these selected plants may well be cut for the table if the crop is profuse ; this will give the remainder a better chance of reaching full maturity. Of course, if a pod here and there on all the plants is allowed to ripen fully the whole crop will suffer ; that is why we limit our attentions to certain selected stems. When the pods and leaves have begun to dry the whole sprays are pulled up and hung somewhere in the sun or in a dry shed to complete the process of ripening. After a time the pods will become brittle, and then they must be carefully watched. As soon as they begin to crack and open the beans are removed and placed in a shallow tray where the sun can complete its work of drying and ripening.

When thoroughly dry they may be stored in jars or glass bottles, but the place of storage must be neither damp nor close to a frequently used gas burner.

What has been said of runner beans applies also to peas and all other pod-bearing plants. With such things as carrots, parsnips, turnips, and celery, the best course is to plant fine specimens of each in the spring, or leave roots in the ground from last year's crop. They will

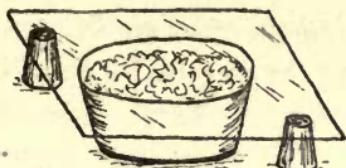


Fig. 1.

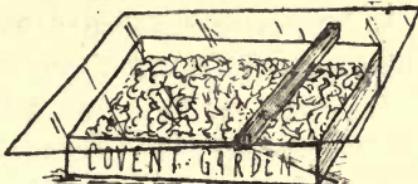


Fig. 2.

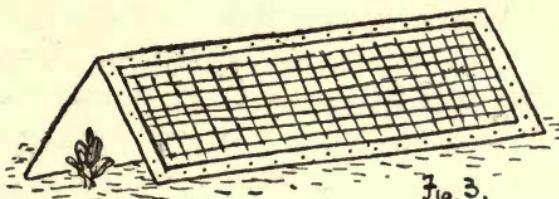


Fig. 3.



Fig. 6.

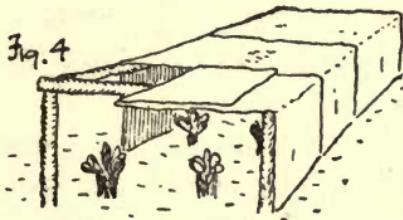


Fig. 4.



Fig. 8.

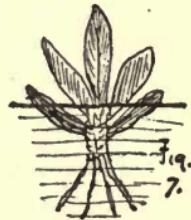


Fig. 7.



Fig. 5.



Fig. 9.



Fig. 10.

PLATE 5.—Hints on the Care of Seedlings. Air is necessary for the growth of sturdy seedlings. Give it on suitable occasions as suggested in Figs. 1 and 2. Protect newly planted seedlings from the sun by such means as are illustrated in Figs. 3 and 4. When planted in depressions as shown in Fig. 5, seedlings withstand the frost better than if bedded out on the level. Fig. 6 gives an idea as to the correct depth for planting seedlings. The plant shown in Fig. 7 is too low in the ground. A concave space preserves moisture (Fig. 8), and permits of easy earthing-up when bad weather appears (Fig. 9). Always lift a seedling with a good ball of earth surrounding the root (Fig. 10).

quickly become established, will throw out a good mass of foliage, will burst into flower and the ripe seed follows in due course. In their case it is often a difficult matter to know when to harvest the crop. We know that mature seeds only are of use, and we also know that when maturity is reached the tiny capsules burst open and shed their contents with a rapidity that is most aggravating. On our ground we tie inverted paper bags over the heads of the plants just before the seeds seem ripe and, when there is no doubt that they are mature, we pull up the whole plants, hang them up by the roots in a dry shed and, in a day or so, the capsules empty themselves into the paper bags. Of course, the receptacles must be tied quite tightly and harvesting can only be done when the produce is dry.

Onions and potatoes may be propagated by sorting out the smallest specimens from the crops when lifting in the autumn, thoroughly drying them and planting in the next spring. Potato stock requires changing every two or three years ; home grown tubers, therefore, must only be used every alternate year.

Cucumber and a few other seeds need fertilizing before they are of use. To procure supplies for growing purposes is somewhat difficult and should be attempted by the practised hand only.

Thus it is seen that every allotment-holder and gardener can do much towards raising his own seed supplies. The main rules are : (1) select vigorous plants, (2) wait patiently until the seeds ripen, (3) gather when they are dry, (4) and store in a dry place.

CHAPTER IX

FOES AND FRIENDS OF THE VEGETABLE GROWER

THE list of foes is, unfortunately, more formidable than that of friends, as far as the vegetable grower is concerned, and in consequence we will deal with the obnoxious creatures first. The new hand must not expect to encounter all the conspirators mentioned below in his first season of work, but a goodly number of specimens are sure to come his way and he must know how to recognise and deal with them without loss of time.

Prevention is always better than cure, therefore, in a general way

- (a) Dig deeply to disturb the creatures.
- (b) Manure scientifically to ensure strong plant growth which will be able to withstand the onslaughts of many pests.
- (c) Hoe constantly to expose surface inhabitants.
- (d) Use lime frequently and in small doses to make conditions unpleasant for the unwanted visitors.
- (e) Search for caterpillars, etc., in likely places before damage has been committed.

Having offered these few preliminary suggestions, we will turn to the depredators themselves :—

Ants.—These creatures become a nuisance under glass. Pour boiling water on the hillocks thrown up by them. Trap in inverted flower pots smeared with any treacly substance, or dust with Keating's powder.

Aphis.—See Chapter XI., p. 84. Numerous varieties of this pest infest the crops. When they are found in frames and conservatories use a fumigating preparation. For outdoor requirements, spray with a solution made as follows: Put a gallon of water in an old saucepan with a quarter of a pound of soft soap and an equal weight of quassia chips and boil steadily. Dilute with an equal bulk of hot water and use warm.

Beetroot Carrion Beetle.—This foe eats the leaves when they are young and tender. Most harm is done by the larvæ, which are dark in colour, shiny-backed, and about half an inch in length.

Black Fly.—See Chapter XII., p. 102.

Cabbage Butterfly.—A most unwelcome visitor to our plots. The butterfly is of a greenish-white colour with grey-black markings. The eggs laid by it, generally on the underside of the leaves, hatch out and become rapacious caterpillars. Dust the leaves with lime or sprinkle with salt water and hand-pick the caterpillars at frequent intervals. Sparrows, robins, blackbirds, and thrushes will assist in the good work; so will dragon flies (see Plate 16, Figs. 2 and 3).

Cabbage Fly.—This fly feeds on the stems and roots of various plants, causing them to droop. The maggots are about a third of an inch in length and ashy-grey in colour. The affected plants must be burnt. To prevent attacks of these pests dip the seedlings in a paste-like mixture of soot and lime, or dig Vaporite into the ground prior to planting. See also Chapter XI., p. 85.

Cabbage Moth.—Is usually most troublesome in late summer and autumn, when it attacks the tender portions of the brassica and some other plants. The caterpillars are pale green when young and later become dull brown on the backs and dull yellow underneath. Hand-pick, use a wash such as Abol, dig Vaporite into the ground or spray with a strong solution of salt.

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Carrot Fly.—See Chapter XV., p. 132 (Plate 16, Figs. 5 and 6).

Celery Fly.—See Chapter XV., p. 135.

Cockchafer.—This unpleasant creature, shown in Plate 16, Fig. 7, feeds on the roots of many plants and does considerable damage. The beetle is black, with grey hairs and red patches at the wings. The grub is fleshy and ashy-white and is usually found in a curved attitude whilst we are digging.

Daddy Long Legs or Crane Fly.—In the grub state, it is known as the leather-jacket, when it does untold harm to potatoes, beans, cabbages, etc. Hoe the surface so that birds may find them, dig in lime, or trap with slices of carrot pegged into the ground just below the surface. Examine these traps at regular intervals and search all around for specimens (Plate 16, Fig. 8).

Eelworm.—A pest which pays particular attention to cucumbers and tomatoes ; it burrows into the root formations. It may be recognised by the gradual drooping of an attacked plant. There is no remedy ; pull up the plant, spray the surroundings with dilute carbolic acid, dig in Vaporite, and grow a totally different kind of plant in the earth containing the pest.

Gall Weevil.—Chapter XI., p. 84.

Mice.—Very partial to the peas and beans, especially when freshly sown on town allotments. Trapping is the most satisfactory method.

Millipede.—Not such an injurious creature as is often supposed, but sometimes attacks the fresh planted seeds of beans and peas.

Onion Fly.—See Chapter XIV., p. 126.

Parsnip Canker.—See Chapter XV., p. 135.

Pea and Bean Weevil.—See Chapter XII., p. 102.

Red Spider.—Sometimes these are found in open quarters but are most destructive under glass where heat is provided.

They injure the young leaves and so weaken the plants. Spray the creatures with Abol and keep the air moist (Plate 16, Fig. 12).

Root Fly.—See Chapter XI., p. 85, also Cabbage Fly, above.

Slugs and Snails.—These are the worst enemies of the vegetable grower. Sprinkle the ground with lime; pile little circular mounds of soot or lime around young seedlings, and replenish after a fall of rain. Catch by hand after sundown. Use a soil insecticide.

Thrips (Black Fly).—See Chapter XII., p. 102.

Tiger Moth.—Better known as the woolly bear, this pest does considerable damage to lettuces. Hand-picking is the best remedy.

Turnip (Leaf Miners).—They burrow under the surface skin of the leaf and make the plants sickly, finally causing decay. In mild cases scratch away the surface skin with a pocket knife and scrape out the discoloured portions. Spray the foliage with a mixture of soft soap and water to which a little paraffin has been added.

Wireworm (Larva of Click Beetle or Skipjack).—This creature, shown on Plate 16, Fig. 13, attacks root crops with much persistency. It eats into the roots and so causes the plants to droop and die. Allotment-holders breaking up grass land must be prepared to find their plots infested with the pest. When such is the case, burn the sods of grass or bury them deeply. Dig in Vaporite, use superphosphate as a manure, scatter and lightly fork in soot, let fowls run over the ground, and permit rooks, starlings and plovers to search for them.

Of the friends of the vegetable grower, the following may be cited :—

Earthworms,
Frogs and toads,

Hedgehogs,
Ichneumon Fly,

Ladybirds,	Hoverer Fly,
Lacewing Fly,	Sparrow,
Glow-worm,	Starling,
Blackbird,	Fly Catchers,
Titmouse,	Martins,
Sparrow Hawk,	Swallow,
Gulls,	Owls,
Finches,	Jay,
Swift,	Linnet,
Thrush,	Magpie.

To the list may be added all grain-eating birds, as they feed their young on worms and grubs. Of course, some of the above are apt to cause damage, but the good they do outweighs the bad.

CHAPTER X

HINTS FOR EXHIBITORS

THE spread of the allotment movement has brought in its train a whole host of local exhibitions where valuable prizes are offered for choice specimens of vegetables. Accordingly, we find that men who twelve months ago were ignorant of the difference between a spade and a hoe are now keenly competing one against another in the production of crisp cabbages, attenuated beans and record carrots. All this is as it should be, for the grower who strives to rear prize crops must study the art and science of vegeculture and become master of all the most approved methods. But, and this is a point we wish to emphasise, some exhibitors of our acquaintance give their whole time and land to the nursing of a handful of seedlings or plants which reward their sponsors by numerous "firsts" on show day. Such ambitious cultivation is most commendable, but it does not help to solve in any measurable degree the food question, which should be our first consideration to-day. Therefore, while we urge the reader to allot some portion of his energies to the rearing of prize specimens, we must point out that all such work needs to be kept subservient to the growing of bumper crops.

Would-be exhibitors are advised to sow seeds intended for prize culture a trifle more thinly than usual and rear the seedlings, generally, in soil richer than customary.

All long-rooted specimens, as carrots, parsnips, etc., shape best when planted in compartments made in the ground by means of a dibber and filled with carefully selected earth. A generous allowance must be made when sowing or planting out for unsatisfactory germination, weak growth, unshapely formations, etc., and where the number of specimens required to form an exhibit is stated it is always wise to take to the show a surplus in case of accidents. Where a number of either potatoes, carrots, turnips, etc., form an entry all the specimens should be about the same size, for big and little things shown together rarely please the judges. Every vegetable in composite groups does not receive the same maximum number of points (*i.e.*, potatoes score more than artichokes, and radishes less than almost any other vegetable), therefore, the groups should be composed of as many of the high-scoring varieties as possible. In preparing the vegetables, clean them with the utmost care. Never use a brush for scrubbing, but wipe softly with a sponge. Carry the produce to the exhibition in cotton wool or padded boxes. Further particulars referring to individual vegetables are given below:—

Artichokes (Jerusalem).—Choose symmetrical tubers, well rounded or spindle shaped, but reject those that are erratic in form. A rough granulated skin should be avoided.

Asparagus.—Specimens must be absolutely straight and of the same width throughout the entire length. The formation of the heads must be perfect and the stalks well blanched.

Beans (Broad).—The pods must be of more than medium size, well shaped, and containing plump beans. The outside skin of the pod to be quite green with no traces of brown discolouration. Handle the pods as little as possible, if at all.

Beans (Climbing and Dwarf).—The pods must be straight, of good length, a delicate green, not stringy, not leathery, but brittle. If mature a few days before showing, cut with ample stalk and place in the dark, in water.

Beetroots.—These must be of good tapering or spherical shape, according to the variety. The tap root of the latter must be complete, but no side hair roots should be left. A smooth skin like kid is helpful. Specimens must not be pale in colour nor over large. Only show with the best foliage remaining. Lift a few days before showing, and store, when clean, in fine, dry sand.

Broccoli.—Good dome-shaped heads made up of small regular rosettes, which must be white and perfectly unsmeared, score most points. They stand a poor chance unless the head is close and not loose. Fair sizes do best. If mature some days before showing, cut and hang up head downwards in a cool cellar.

Brussels Sprouts.—The sprouts must be of good colour and form. When the whole plant is exhibited, the main stalk should be upright and the top of a good round shape.

Cabbages.—Crisp, close hearts with attractive outside leaves are best. The general shape should be quite typical of the variety. They must not be of giant size, nor eaten by grubs. The rough outer leaves should be removed.

Carrots.—As for beetroots, but the collars must not be green.

Cauliflowers.—As for broccoli.

Celery.—The stems must be as large as possible, white in colour, and with little or no trace of green. They should be brittle and with some foliage. The outside stems ought to be taken off and the roots pointed with a sharp knife. Do not lift until the morning of the show.

Cucumbers.—The flower should remain on the tip. The specimens must be straight with not too much tapering neck. Crispness is a valuable quality. A good rich green skin is valued. The largest specimens ought to be shown.

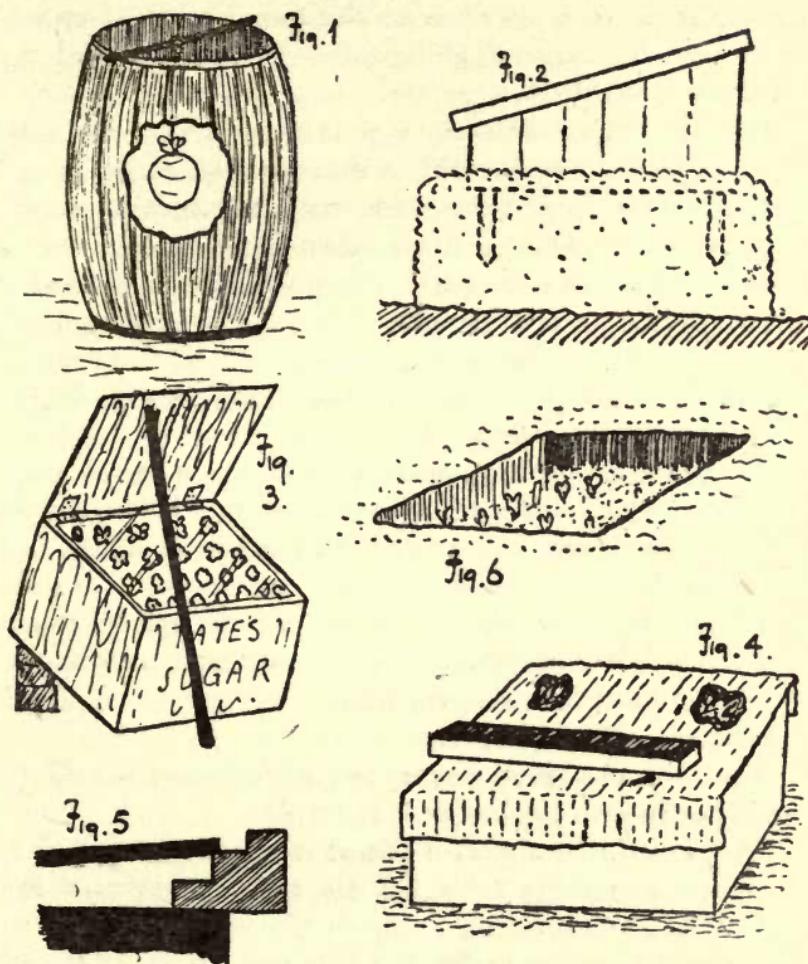


PLATE 6.—Hotbeds and Cold Frames. Fig. 1 shows an arrangement for making soot water (see p. 51). Fig. 2 illustrates the hotbed described in Chapter VI. A box with a glass lid and an additional wooden lid is useful for forcing purposes (Fig. 3). Fig. 4 reminds us that in windy cold weather frames must be covered and weighted. Fig. 5 shows a simple device for propping open frame lights. A pit lined with manure serves the same purpose as a hotbed and is more economical (Fig. 6).

Leeks.—Specimens should be carefully blanched, and thick, erect, and of much the same width throughout. The heads must show no signs of filling out. Do not lift until the morning of the show.

Lettuces.—The cos variety is judged most on shape, size, and colour of the heart; the cabbage variety, on shape and colour. Both must have fresh, crisp leaves, the outside ones removed. The weight is taken into account.

Mushrooms.—Well rounded domes which show no sign of turning upwards are a necessity. Stems must be complete. No cracks or other damage is permissible. The upper side of the head must not be discoloured and the underside should be a delicate pink.

Onions.—Summer and autumn onions must be crisp and firm and not soft, with attractive shiny skins. Spring onions are best when well bulbed and with thinnish necks. All varieties should be shown with a portion of the stem attached, not much should be cut off the spring onion, however. Lift as late as possible, wash and remove the loose casing and trim the root hairs.

Parsnips.—See beetroots.

Peas.—As for broad beans, but special care should be taken to preserve the bloom of the pods.

Potatoes.—Prizes are often offered for the largest potatoes. A specimen weighing 2 lbs. 13½ ozs. took first prize at the Vacant Land Cultivation Society's Show in 1917. When prizes are for the best potatoes no curiosity of shape should be submitted. Regular-formed specimens with few eyes, not deeply set, an unrubbed skin free from blemishes and a good-coloured flesh, are most sought for. Keep in the dark between lifting and showing, but wash the day previous.

Radishes.—As for turnips. The total marks for this vegetable, at most shows, is very low.

Rhubarb.—The stalks must be erect and of pleasing colour; the flesh, not flabby. Exhibit with the leaves removed.

Savoys.—As for cabbages.

Spinach.—Aim at showing good-sized leaves with deep-green stalks. They must not have lost crispness.

Tomatoes.—Well-ripened and deep-coloured specimens are best. They must be firm though not hard. The skin must not be dull nor spotty. Show the largest specimens.

Turnips.—Nicely-rounded, fair-sized specimens of good colour without disfiguring marks are best. Slow-grown produce is not of much use. Unsatisfactory green leaves should be carefully pinched out of the bunches.

Vegetable Marrows.—Huge specimens only win prizes given by seed merchants. Show fairly uniform shapes, not bulbing considerably at one end. The skin ought not to be leathery nor the inside fibrous. Preserve the flower when possible, also the bloom on the skin.

CHAPTER XI

THE CABBAGE OR BRASSICA FAMILY

ELSEWHERE we state that the most useful crop an allotment-holder or gardener can grow is the potato. Second only to this useful tuber is the cabbage and its close relations mentioned in the present chapter. Each of these brassicas is a valuable and necessary food and, happily, all are comparatively easy to raise.

Cultivation is much the same for all members of the cabbage family. They like a well-worked, deeply-dug soil, rich in natural manures. They are not over particular as to site, nor do they demand any special kind of ground. As long as the plot is well nourished, suitably worked, and did not bear brassicas in the previous year, the crop will flourish.

In the autumn previous to sowing or planting, the ground should be dug as explained on p. 30 and dressed at the time with horse manure, if it is a heavy soil, or dug in autumn and dressed later on with cow or pig manure if the soil is sandy. Lime is also beneficial, especially on heavy ground. In addition, any supplies which are at hand of vegetable manures, such as leaves, crop-clearings, weeds and kitchen refuse may be added, but plants burdened with objectionable seeds or tainted by disease ought to be carefully eliminated. Afterwards, the

surface needs ridging. When the plants are in, the ground should be made firm and kept so. Surface hoeing is useful as it kills the weeds, helps the birds to pick out grubs, and skims off the caked upper crust of the earth, allowing moisture to penetrate to the roots. Artificial nourishment must be given occasionally if the best results are to be obtained.

The Board of Agriculture advises :—

(1) Sulphate of ammonia applied at the rate of half an ounce per square yard as soon as growth starts.

(2) Superphosphate, when the crop refuses to "heart." Use it alone or in conjunction with steamed bone flour, at the rate of one ounce per square yard, at the time of planting.

(3) In districts where crops on light and medium soils are liable to suffer from drought, salt is very helpful and will usually increase the yields. It should be applied at the rate of one ounce per square yard.

(4) Well diluted manure water is also useful, and should be applied to the roots, not the leaves, about once a fortnight, when the plants are established.

The cabbage family, unfortunately, is attacked by many destructive pests. The following must be noted :—

(1) *Club-Root* (or Anbury, Finger and Toe).—This is a fungoidal growth which injures the roots. It is highly infectious, but is not transmitted through the air as is the case with the potato disease. It may lie dormant in the ground for at least two years. The best known preventive measure is to observe the laws of rotation, and to lime the ground before and after a crop of brassicas. Chalk will serve instead of lime but its influence is not so great. Another measure is to attend to the drainage of the ground, for a waterlogged plot may assist the spread of the growth.

The disease first manifests itself in the roots, small wart-like excrescences appearing, whilst later on a form of rot sets in. No plants affected should be pricked out, and, where an attack is feared, each seedling should be dipped in a puddle of lime, clay, soot, and water before being planted.

(2) *Cabbage Aphis*.—This is a troublesome pest that multiplies rapidly in summer and autumn when the plants are not growing under the best conditions. The creatures live in colonies, are sluggish and of a dull grey colour. They rob the leaves of their green pigment and seriously arrest growth. The best plan is to give nourishment to the plants by means of artificial stimulants, whilst local treatment consists in wiping off the creatures, with gloved hands, powdering the wet leaves with lime or spraying with soft soap and quassia chips (see *Aphis* on p. 72).

(3) *Gall Weevil*.—This is a white grub which infests the portions, just under the soil, of the stems of the cabbage family. According to the measure of destruction which it causes so the plants are affected ; sometimes the damage merely makes the plants sickly whilst, at other times, they collapse and die. In mild cases the swellings may be cut away from the stems and the affected parts dabbed with a solution of lime, clay, soot and water ; in severe cases there is no cure. After the crop has been removed a strong dressing of lime is beneficial.

(4) *Various Flies, etc.*, besides the pests mentioned above, attack the brassicas. General treatment consists in spraying and liming as suggested for club root and aphid (see also paragraph 7).

(5) *Birds* pick out the seeds directly after sowing. Spread out string netting or thread the rows with cotton. Use scarecrows.

(6) *Caterpillars* of a number of kinds, especially those of the cabbage moth and the green-veined white butterfly, are particularly vexing. Hand-picking is the only remedy ;

search, with gloved hands, in the centre of the plants, then go methodically over the outer leaves paying particular attention to the under-surfaces. It is well worth remembering that the dragon fly is a great enemy of these caterpillars. Destroy all eggs that are found, but give the caterpillars to the poultry.

(7) *The Root Fly* is a most destructive pest which attacks the portions of the plant below the ground. A good deal may be done in small plots and gardens to overcome this fly by the use of tar. Take a square of tarred felt or linoleum which has been smeared with tar, cut a line to the centre and shape out a small circle. Place this around the stem of the seedling and press it down firmly on the ground. As the plant grows, make the circle larger to accommodate, comfortably, the stem. In this way we may effectively suppress this troublesome pest.

Cabbages, including *Coleworts* and *Savoys*, are probably the most frequently grown members of the brassica family. They are certainly not the most tasty form of greens, but as supplies may be procured all the year round by judicious planting there is much to be said for their cultivation.

The grower who wishes to have a perpetual supply should sow the early varieties of cabbages at the end of March, for cutting in June. A fortnightly sowing from this time onwards will give produce until the end of September, and for a supply in the spring sow in July. In this way we shall secure matured plants during nine months of the year. To make provision for the remaining three months it is a good plan to hasten early varieties by feeding copiously with manure water and to retard the late kinds by transplanting once, twice, or thrice. Even when cabbages are raised according to

this time-table there will be little produce worth cutting in January and February. For these months sow Savoys in early summer, but do not transplant them more than once. If cabbage seeds be sown under glass in February, with the soil just covering them, and kept in a light place where a temperature of between 60° and 70° can be maintained, then transplanted to a cold frame when large enough to handle, and finally bedded out in April, an early crop will result. These will serve admirably for young greens. When ready, cut off the heads of alternate plants as required, this will give the remaining crop room for expansion. The stalks left in the ground will shoot and produce an additional supply of useful greens.

Cabbages are procurable in many varieties. In shape they may be classed as (1) conical hearted, (2) sugar-loaf hearted, and (3) drumhead. The latter type enjoy considerable popularity. The following species are recommended :—

For early cutting—*Ellam's Early* and *Flower of Spring*.

For late spring and summer—*Nonpareil* and *Enfield Market*.

For autumn and winter—*Manchester Market*, *Drumhead* and *Miniature Drumhead*. (These have the advantage of doing well in a fairly crowded state.)

For pickling—*Red Dutch* and *Carters' Red Pickling*.

The great aim with cabbages is to prevent them bolting, that is to say, running up a stout mid-stalk which bears flowers to the detriment of the heart. To prevent this, select varieties which are little prone to the habit as, for instance, *Manchester Market*. Then dig deeply, for it is only plants with shallow roots that bolt and, when

bedding, press the earth firmly around the stalks. Keep the hoe going between the rows, and water occasionally to prevent the ground becoming hot and dry.

Coleworts are brassicas which possess a rapid growth, but which do not give the best of hearts ; they are useful as winter greens. Sow in July and plant out in September on ground cleared of potatoes, peas, beans, etc. They should stand ten inches apart. The *Rosette* is a good variety.

*Savoy*s make splendid winter greens as the leaves require frosting to acquire perfection. In their case the ground must be made firm by treading or the cold will penetrate to the roots, which do not thrive when attacked by frost. *Perfection*, *Ormskirk*, and *Best of All* are varieties to be recommended. The *Drumhead* variety grows to a good size, but is deemed too coarse by many.

Brussels Sprouts are a species of brassica possessing a lengthy stem, studded with tiny cabbage heads. Cultural hints are generally similar to those set out for the cabbage, but, as the period of growth is extremely long, it is well to get the seeds in as early as possible. In January sow under glass and keep the pan or box in a light place where a temperature of between 60° to 65° can be maintained ; harden the seedlings during late March and plant out in April.

Later crops may be grown out of doors by sowing in a bed in April and transplanting, when ready, in rows three feet apart, a similar space separating each plant in the rows. Transplanting is almost a necessity with Brussels sprouts, as plants that have not been so treated stand too high out of the ground. Every fortnight

during the summer, manure water should be poured around the stems and all discoloured leaves removed. When the sprouts begin to form it may be necessary to cut out some of the under foliage in order to let in the light, but this depends entirely upon the size of the plant and the proximity of the rows. After windy weather the ground often needs pressing firmly around the stalks. Ordinary frosts have little or no effect on this member of the brassica family.

Unless the whole of a plant is used at the same time, it is advisable to gather the sprouts from the bottom first and then work upwards, finally cutting the head.

Varieties worth noting are *Carters' Perfection*, *Aigburth*, *Scrymger's Giant*, and *Matchless*.

The Cauliflower, probably the most palatable member of the brassicas, is the least hardy; consequently it calls for special treatment. Early varieties are sown under glass in a pan or box containing rich moist loam towards the end of January and kept at a temperature of between 60° and 70°. When large enough to handle the seedlings are pricked off in a box and placed in a cold frame. Finally, in April, they are planted out of doors in their permanent quarters, standing twelve inches from each other in rows that are eighteen inches apart.

An April sowing will give good heads in the late autumn. These should be bedded out about June, leaving a space of two feet, each way, between the plants.

In all cases give copious draughts of manure water after the plants are established and, when the heads are

forming and extremes of heat or cold anticipated, one or more of the largest outside leaves should be bent over the flower to form a protective covering.

Among the most useful varieties are *Early Snowball*, *Magnum Bonum*, *Walcheren*, and *Veitch's Autumn Giant*.

Broccoli serves every purpose that is met by the cauliflower but it is far more hardy and gives produce over a greater portion of the year. On this account the grower with restricted accommodation is well advised to devote his attentions to the former vegetable, leaving the latter to those who have ample ground space.

For cutting from September to December, sow *Walcheren*, *Veitch's Self-Protecting*, or *Snow's Winter White* in April, in shallow pans or boxes and keep in a cold frame. Bed out in June with a space of two feet each way between the plants.

For cutting from January to April, sow *Leamington*, *Sindringham*, *Winter White*, or *Knight's Protecting* in seed beds in April. Transplant the tender plants in June to temporary quarters, giving six or eight inches between the seedlings and rows and, in July or August, bed out two feet apart on a plot which has been cleared of an early-maturing crop.

For cutting from April to June, sow *Carters' Champion*, *Eclipse*, or *Late Queen* in the open during the month of May of the previous year.

In addition to the broccolis which, to the untutored eye, appear to be cauliflowers, there are the sprouting kinds. These form miniature bushes of leaves sprinkled thickly with tiny white buttons or heads. In this group there are *Purple Sprouting* and *White Sprouting* varieties.

Cultural hints are similar to those set out for cabbages,

but it is well to emphasise the need for a firm bed and to mention that fresh manure should be withheld as it encourages soft growth. As the plants stand in the open all through the winter, it will be a wise precaution to slope them in November. This is done by removing earth from the north side of the plant, pressing the latter down and placing the disturbed earth on the south side.

Borecole or Kale is a useful form of green vegetable as it matures in winter and ranks among the hardiest of all plants. The colouring and shape of the kales present much variety. Some are green, others purple, yellow, or blue, whilst all have foliage of a highly ornamental character. The seeds should be sown in an outdoor bed during April and transplanted to the permanent quarters when the peas have run their course. Place them eighteen inches apart in rows two feet asunder and follow the rules laid down for broccoli. Gather the full-grown leaves from time to time, but do not pull up the roots until all the young shoots have matured.

Good varieties are *Asparagus Kale*, *Drumhead Kale*, *Half Tall Scotch Kale*, *Imperial Hearting*, and *Storries' Albino*.

Kohl-Rabi, a form of cabbage-leaved turnip, is essentially a food for cattle, but there are palatable varieties which are not coarse and are well worth growing in gardens and allotments, especially in place of turnips, when these are found to grow woody and rank. The leaves as well as the bulbs are edible.

Cultivation consists in sowing seeds in drills fifteen inches apart in May and selecting a well-manured plot. When the seedlings appear they should be thinned out, leaving eight inches between them. Select *Early Purple*

or *Early Vienna* varieties and follow the rules set down for cabbages. Unlike turnips, kohl-rabi permits of successful storing.

Doubt has been cast upon the advisability of eating this vegetable by the report of a German professor who ascribed a widespread epidemic in his country to the use of the kohl-rabi as an article of human consumption. The following, quoted from the *Daily Express*, should be reassuring to those who have hesitated to place this brassica on their table :—“ Allotment-holders who are growing kohl-rabi have been alarmed to read the remarks of Professor Abderhalden, physiologist at Halle University, in a recent lecture on War and Health. He attributed the epidemics at various places in Germany to eating the turnip-rooted cabbages called kohl-rabi.

“ However, Professor Keeble, F.R.S., C.B.E., head of the horticultural section of the Food Production Department, is reassuring. He told a *Daily Express* representative yesterday that Professor Abderhalden’s opinion should be treated with consideration, but with reservation. He should say the trouble was due to the fact that kohl-rabi had entered too largely into the diet of the Germans.

“ “ A moderate quantity of the turnip-rooted cabbage, properly cooked, far from being unwholesome, is an excellent food. It stands to reason that when the general state of the body is lowered by insufficient nutrition, a large number of things, which at other times are quite good and wholesome, may produce bad effects.

“ “ On the whole, I am of opinion that the German professor’s statement seems to be an indication of a general deterioration in the German diet. It appears to indicate that the German physique is becoming low.

"' People may eat kohl-rabi without any apprehension or fear of the results,' added Professor Keeble, 'but, like all vegetables, it needs to be properly cooked.'"

A cookery expert informs the *Daily Express* that kohl-rabi should be cooked thoroughly until quite soft. Special attention should be paid to peeling and cleansing, after which the kohl-rabi should be soaked for about an hour in cold salted water to free it from impurities, but not longer, otherwise some of the useful salts might be lost. The water in which it is to be cooked should be boiling briskly, and be enough to cover thoroughly the contents of the pot, and sufficient salt should be added to season the water.

The Turnip, the last brassica which we shall mention in this chapter, is a vegetable all should grow as it may be raised on ground which might otherwise be standing idle. The period of growth is short, being about six weeks ; thus an early catch crop may be sown and harvested from a plot intended for summer lettuces or we may utilise the space from which winter broccoli has been cleared. (As the turnip and broccoli are both members of the cabbage family, it is an obvious violation of the laws of rotation to sow the former on such a clearing, but it is a violation which may be well practised when our aim should be to get every possible ounce of food out of the ground.) A late crop is obtainable by sowing on the bed where the runner beans stood.

The best turnips are those which have been grown quickly ; therefore we must select a bed in which the earth is not of poor quality. A rich sandy loam, well limed and not dry, suits them admirably. The spot

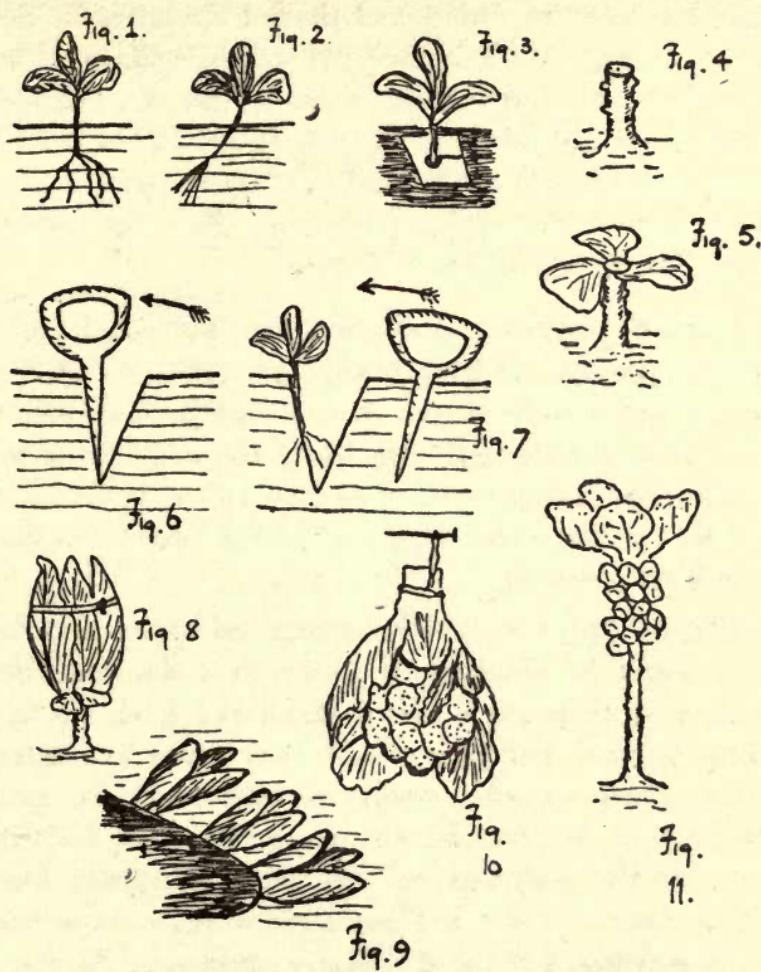


PLATE 7.—Hints on the Treatment of Brassicas. Plant all seedlings with the roots properly spread out (Fig. 1). Do not force them into the ground as indicated in Fig. 2. Place a square of tarred felt around cabbages (Fig. 3): see p. 85. Do not cut cabbages as shown in Fig. 4, but as in Fig. 5. A crop of useful greens results from the second method. Figs. 6 and 7 show how to use the dibber, whilst Fig. 8 shows how to protect cauliflowers from the frosts and fogs. Fig. 9 shows how to heel broccoli. If hung up, head downwards, a cauliflower will keep fresh for some time (Fig. 10). Pick Brussels Sprouts from the bottom of the stem and work upwards (Fig. 11).

should be open in winter and shaded in summer. Sow the seeds from late February onwards in drills sprinkled liberally with superphosphate, soot, and the ash from bonfires, all lightly covered with earth. Thin out the young plants until they stand ten inches apart and use the thinnings for table purposes. Hoe the ground constantly and give plenty of water.

Turnip-tops are a form of green vegetable much appreciated by many. If an early supply is required, sow seed thickly and broadcast and do not wait for the roots to form before gathering. Or leave the roots of a last year's crop in the ground. They will sprout in the spring and give a more tasty supply of greens than is obtained from a fresh sowing.

Swede Turnips are much appreciated by country folk and should be more often grown by town allotment-holders as they are a useful and tasty food. Sow in damp but not wet ground and keep moist in summer. Being gross feeders, liquid manure must be given frequently. Scatter the seed in drills during May and thin out the seedlings so that they eventually stand a foot apart. Frost has but little effect on the roots when growing, but those that are lifted must be stored in a clamp.

The Turnip Flea or Beetle is a very destructive pest which feeds on the leaves, sometimes eating them completely away. To check their depredations, speed up the growth of the plants and dust them with lime or soot.

It is not every grower who wishes to store turnips; those who do will find the Board of Agriculture's leaflet No. 153 of much interest.

CHAPTER XII

PEAS AND BEANS

EVERY grower of vegetables should make a point of raising as large a crop of peas and beans as his ground will allow, for not only are these leguminosæ a much-prized article of diet, but they enrich the ground with nitrogenous matter of no little worth. It is true they take much nourishment of another kind from the soil, but all they remove may be accounted for by manuring heavily with both naturals and artificials, *e.g.*, cow or horse manure, well dug in before sowing, and superphosphate and steamed bone flour, forked in at intervals when the plants are growing, especially when the flowers and pods are forming.

As we must manure heavily for peas and beans, and as fresh material may be used if it is dug in deeply, it is a good plan to dress a portion of last year's carrot, parsnip or beetroot bed—which has now become deficient of manure—and to use it for this crop. In this way we prepare for the peas and beans and also revive the soil of the old carrot bed which has become spent.

In cases where the fences around a garden are considered the most favourable positions for growing crops of climbing leguminosæ, it will be evident that to plant them in the same ground year after year must lead to poor results. To overcome this, always grow the peas and beans along the fences but interchange the top layer

of soil with that of the carrot bed. This method will allow for due observance of correct rotation and enable the gardener to grow the tall climbing plants where they will be least in the way.

Peas.—Where these are much appreciated, three kinds should be grown: *Carters' Eight Weeks* or *Chelsea Gem* for forcing; *Laxton's Superb* or *Early Morn* for the first earlies; and the following Marrowfats for main crops: *Quite Content*, *Glory of Devon*, and *Alderman*.

To force peas, procure some fair-sized pots, place a layer of broken earthenware inside to provide for drainage and half fill with a good compost of rich leaf mould and well-spent manure. Sow a few seeds in December (half a dozen in a six-inch pot), and maintain at a temperature of 55°. When the seedlings have shot up add more compost, almost filling the pot. In time, train the plants to slight stakes, giving plenty of air and water occasionally, sometimes with well-diluted manure liquid. If preferred, the plants may be hardened in a cold frame and bedded out in March, care being taken to protect them against frost by coverings of straw.

For first-early or main-crop peas, a trench two and a half feet deep and one foot wide should be dug. At the bottom of this, manure is placed and then a six-inch layer of good soil containing a few handfuls of soot is added. After making this firm the peas are placed (in March for earlies and late April for main crops) in two rows thus,

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a space of four or five inches separating the seeds. Two inches of fine soil is then spread over them, and this

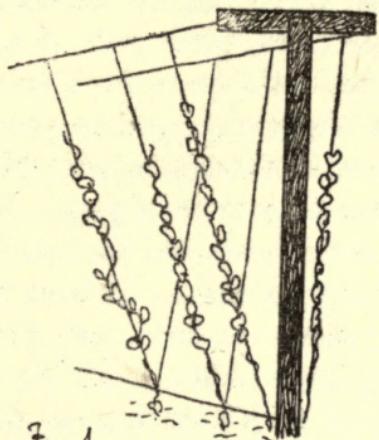


Fig. 1.

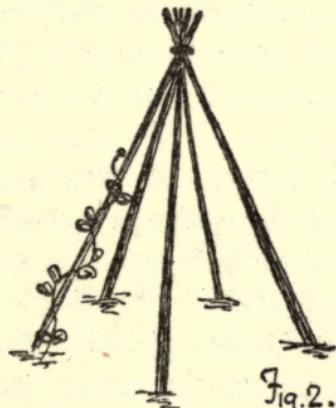


Fig. 2.

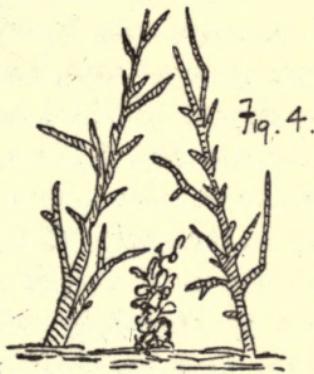


Fig. 4.



Fig. 3.

PLATE 8.—Hints on Staking Peas and Beans. Fig. 4 shows a wrong and Fig. 5 a right way of arranging the stakes for peas.

should bring the top of the trench to within two inches of the surface of the surrounding ground.

Peas do not thrive if the roots are allowed to become dry; therefore, earth up the stems, use the hoe along the trenches and, in extreme cases, place pads of wet-mown grass around the roots, but change these before they decay. A mulching of long strawy manure, placed in the trenches, will considerably assist good growth.

Birds are often a great trial to growers of peas. Not only do they snip off the young shoots and flowers, but they dig up the seeds and devour them. Protect the seeds by threading cotton along the rows and place netting over the climbing plants. When slugs become active search for them at night with a lantern and dust the rows with lime.

Stake the seedlings as early as possible, certainly before they have commenced to climb or crawl, otherwise they will be difficult to train. Bushy stakes are better than canes or lengths of string.

Two other points must be noted. (1) Sow a little reserve bed of peas. Some of the seedlings raised in it may be useful for transplanting to the trenches in spaces where the original seeds have failed. (2) Commence gathering as soon as the pods become plump. Failure to do this will arrest the growth of the oncoming crop.

It may be well to point out, in conclusion, that the edible pea not only produces valuable food, but is also highly ornamental and might well be grown in place of the sweet pea during these times of stress. A judicious blending of the white and red flowering varieties will provide a hedge or screen of much artistic merit.

Beans, Climbing.—The cultivation of these beans follows closely on the lines set down for peas, but a few differences must be noted. Outdoor sowings should not be made before the second week in May. If it is desired to obtain a crop at the earliest possible moment, seeds which have been soaked in water for an hour may be sown in pots during April and raised in a cold frame. Eventually they should be transplanted in the open during the latter end of May or the beginning of June. This plan will give produce about three weeks earlier than if the seeds are placed directly in the open ground. Beans must be planted further apart than peas, the requisite distance being about nine inches. Give them more water than peas and spray the flowers in order to make them set. Peas hold themselves up by means of tendrils, but beans twine round their support ; therefore whilst bushy stakes serve for peas, straight sticks or twine, made taut, serve best for beans. Remember that, although the fleshy green pods and the undeveloped beans are a good food, the full-grown purple-coloured seeds are almost as harmful as the deadly nightshade.

Good varieties of this vegetable are : *Ne Plus Ultra*, *Giant Painted Lady*, *Sutton's A1*, and *Jubilee Runner*.

Beans, Dwarf.—The dwarf French bean is the most useful member of this class. It grows rapidly, requires little or no staking and produces pods of a smoother and more delicate nature than are afforded by the climbing varieties. Cultural hints are similar to those for the runner beans, but short Y-shaped props are used instead of six-foot sticks.

Dwarf French beans lend themselves admirably to

forcing which may be undertaken at any time of the year. Most growers, however, begin in November and thus reap harvests from February onwards. Take some seven-inch pots, place a layer of broken earthenware at the bottom of each and, on this, arrange some horse manure. Cover with good leafy loam so that the pot is three parts full. Sow the seeds one and a half inches apart and a half inch down, and then give a slight watering. Keep the pots at a temperature of about 60°. When the young shoots appear, give moderate waterings daily and, when they are three inches high, fill up the pots with loam and manure, in equal quantities. Turn the pots round daily if the seedlings become drawn to the side lights and give, each evening, a dose of dilute manure water. Pick the pods as soon as they are large enough.

Good varieties are *Canadian Wonder* and *Ne Plus Ultra*, for growing out of doors; *Osborn's Early Forcing* and *Longsword*, for forcing.

Butter beans give pods of a light yellow colour. They are grown far more generally in France, where they are considered a great delicacy, than here. Climbing and dwarf varieties are obtainable. For cultural rules refer to the two previous headings.

Haricot beans are raised by some growers, but the crops are not among the most successful. Those who wish to raise them should select the largest beans from the kitchen supply, soak them well and proceed as for dwarf beans. The earliest pods are sliced prior to cooking, but of the later ones the beans, alone, should be eaten.

Broad Beans mature before the profusion of summer vegetables are ready for the table and, on this account, a few rows, at least, should be sown. Select a strip of good rich soil that is heavy rather than light and well dress it in the winter with manure. In late February, sow the seeds. This is easiest to do if a dibber is used. Push it three inches in the ground, drop in the bean, and press home with the index finger. Be careful that a space is not left below it, for water will accumulate there and rot the roots. Sow the seeds five inches apart in rows separated by about three feet. When the seedlings begin to shoot up, draw the earth around them as a protection against frosts, pinch off the tops of the plants when they have reached a sufficient height, and water with dilute liquid manure as soon as the pods begin to form. Some growers soak the seeds for about two hours before sowing.

If the ground is not wanted when the beans have been gathered, do not pull up the plants but cut them down to within five inches of the ground. Young shoots will be rapidly thrown out which will flower and bear a second crop well worth securing.

When dwarf broad beans are grown, they should be treated as above, but planted two inches down, three inches apart in rows separated by one and a half feet.

Early supplies may be obtained by sowing from October onwards in a comparatively dry, sheltered, and sunny spot, but they will require much careful covering and screening during the depths of the winter.

For October sowings use *Early Mazagan*, to be followed by *Seville Longpod* and *Giant* or *Green Windsor*.

When peas and beans are grown under poor conditions they are prone to attacks of various pests such as the Black Fly and the Pea and Bean Weevil.

The Black Fly or Thrips ruins the plants by making its home on the leaves or more generally on the flowers, sucking the sap from them and causing the petals to shrivel, consequently preventing the formation of the pods. To suppress this pest the Board of Agriculture suggest that all likely shelter for them should be destroyed. Old sticks used for runner beans or peas are a source of much danger. They, and the haulm, should be burnt as soon as the crop is seen to be irreparably damaged. It is certainly advisable not to grow leguminous crops close to where infection has been. Spraying may do some good, but in the case of the blossom-attacks it is a doubtful method. For leaf-destroying thrips there is nothing like pyrethrum wash, formed by adding one ounce of fresh pyrethrum to two gallons of soft water and an ounce of soft soap. Liming the ground is also useful.

Peas and beans are subject to attacks by the *Pea and Bean Weevil*, but the injury is frequently attributed to sparrows and slugs, because the weevils are not by any means easily seen, and readily fall to the ground when alarmed. The weevils eat the leaves and young shoots of the plants and the larvæ devour their roots.

"The beetles lay their eggs either upon or just beneath the soil close to the roots of their food plants. The eggs hatch into small, white, footless, wrinkled grubs, with brown heads and biting jaws. These grubs feed on the roots of peas, beans, clover, sanfoin, and lucerne. When full grown the larvæ are about one-fourth of an inch in length.

"Lime, soot, or lime and soot, mixed, may be advan-

tageously distributed over infested plants while the dew is upon them, or after rain. Finely-powdered guano may also be used in this way. An observer has found that, by covering the rows with fine earth, his peas have been kept free from this pest.

"Spraying the rows of peas with arsenical washes has been found beneficial. Applications of weak mixtures of paraffin and water, with a little soft soap, would make infested plants distasteful to these insects.

"Liquid solutions and finely powdered materials can be easily applied and well distributed with knapsack-machines.

"When peas and beans are attacked, it is desirable to press the soil tightly and firmly round the plants in order to prevent the beetles from coming up from the earth."

(Board of Agriculture Leaflet No. 19.)

CHAPTER XIII

POTATOES

No crop assists the food economy of the country more than that of the potato, but, unfortunately, a great deal of space is required for its proper growth. Personally we think that a third of every allotment or vegetable garden should be put to potato cultivation each year ; this will enable the grower to produce his maximum quantity of the tubers whilst observing the laws of rotation.

If the plot is of fair size, the space should be apportioned between early, second-early, and main-crop varieties, but, if it is small, the two former kinds, only, should be planted. In other words if the grower wants to produce enough potatoes to last him a whole year, he will cultivate the earlies for the sake of new potatoes and the main crop for keeping through the winter. On the other hand, if he has but a small space at his disposal, he will plant earlies so that he has a supply when the tubers are dearest ; he will also get his ground cleared in sufficient time for producing a late crop of some other vegetable.

Soil.—Potatoes will grow in almost any soil, but the finest results are obtained in light, sandy loam, which is well drained and contains plenty of humus. The latter may be suitably provided by digging into the ground

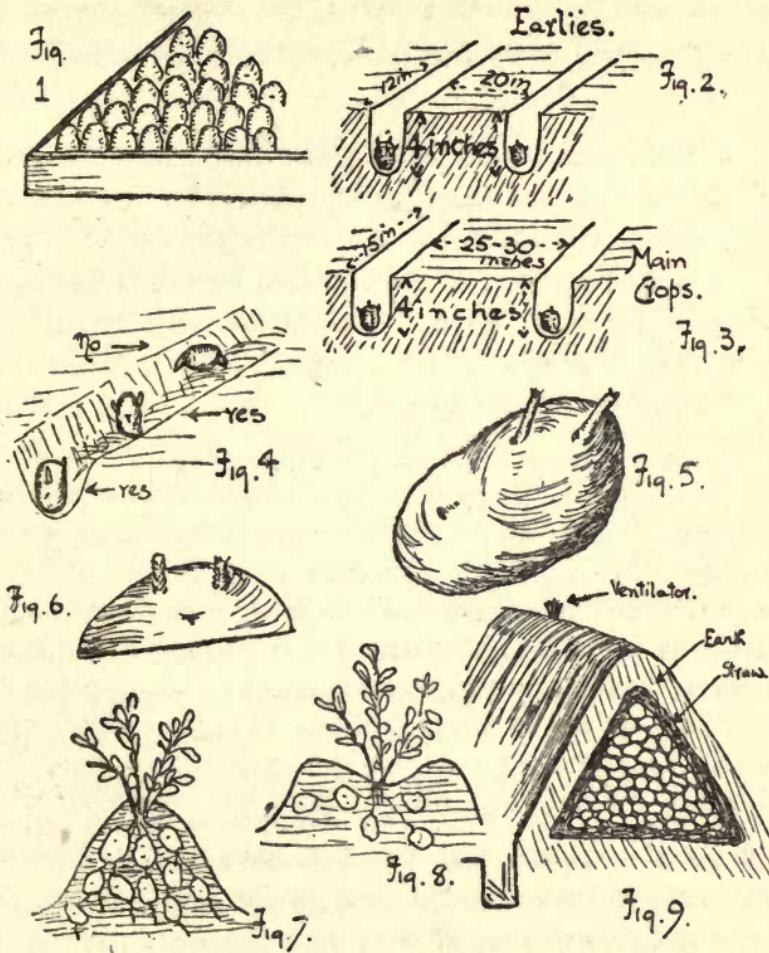


PLATE 9.—Hints on Potato Growing. Fig. 1. A tray of sprouting potatoes. Figs. 2 and 3. Measurements for sowing potatoes. Fig. 4. How to arrange and how not to arrange potatoes in trenches. A seed potato two-thirds of the most suitable size (Fig. 5). If it is decided to cut seed potatoes, provide each section with one or two eyes (Fig. 6). Earth up potatoes as shown in Fig. 7 but not as in Fig. 8. Fig. 9 illustrates a potato clamp.

any decaying vegetable matter which may be available, such as decayed leaves of trees, the outside leaves of cabbages, hedge clippings, and the refuse from the lawn mower.

Manures.—Fresh animal manure should be employed with caution, and most authorities claim that it is unwise to place it on the ground later than the previous autumn, for such dressings tend to produce long straggling haulms and disappointing tubers. This is the plan which we have always adopted, but, quoting from a Board of Agriculture leaflet, we read :—

“ In manuring potatoes a certain amount of dung is always beneficial. It may be applied at different periods of the year, but most experiments show that spring applications give the best results. A dressing of 20 tons of dung per acre is not uncommon, and with such treatment alone good crops may often be obtained. It frequently happens, however, that the foliage is encouraged at the expense of the tubers, especially when artificials are also applied, and actually heavier and more profitable crops can be grown by using half the above quantity of dung with artificials.”

Without a doubt, the use of animal manure has an important effect on the cooking quality of a potato. A heavy spring dressing gives a poor-flavoured tuber; a moderate dressing produces a better tuber, but the best, in our opinion, is grown on land that has been treated with animal manure in the autumn and artificials in the spring.

The Board of Agriculture advises the use of sulphate of ammonia applied to the surface just before the first earthing up, in cases where the crop is grown on the flat. When the potatoes are planted in drills, the sulphate should be applied in the drills at the time of planting.

One ounce is sufficient for every two square yards (one pound per rod).

Steamed bone flour, wood ashes (potash) and seaweed are all good foods for this crop, and many growers follow the practice of strewing old rags and the fluff from carpet sweepers in the drills before planting. On clay land, fine cinders and ashes are of service, but they must be fine, or the tubers will suffer from scab.

In cases where the plot is known to be exceptionally poor and deficient in humus, a sure way of obtaining a good crop is to sow broadcast, early in March, a mixture composed of one pint of winter vetches or tares, and one ounce of white mustard, per rod ; then let it grow till the latter end of May, and dig it in green. This will add nitrates and humus to the soil, will lighten the land, kill off weeds and wireworms, and make the ground much more attractive for potato growing.*

Varieties.—Of course, a great deal depends upon a judicious selection of the varieties which are to be planted. Many beginners have told us that they pick out the small tubers from the kitchen supplies and sprout them, but this is not the best way of going about the work. The proper plan is to buy specially gathered seed from reputable dealers. The following varieties are worth noting.

FIRST EARLY.—READY IN JUNE ONWARDS.

Sharpe's Express.—Has a good reputation for giving abundant crops.

Sharpe's Victor.—A good potato, but not such a satisfactory cropper as the above.

* H. Valentine Davis in "Food Gardening."

Ashleaf.—An old-fashioned variety, but grows well.

Ringleader.—One of the earliest, but gives light crops. Grand variety, however.

Epicure.—Does exceedingly well in light, sandy soils.

Duke of York.—A popular favourite.

SECOND EARLY.—READY IN JULY ONWARDS.

British Queen.—Gives heavy crops and often does well under poor conditions.

Snowdrop.—Well worth growing; not particular as to soil.

White Elephant.—Does well on soils that are not as light as might be.

Windsor Castle.—Produces good crops on medium soils.

King George V.—Gives abundant crops. Free from scab.

White City.—A white-fleshed variety which may be recommended.

MAIN CROP.—READY IN SEPTEMBER.

King Edward VII.—Considered by some a second early; a popular favourite; skin splashed with red; very prolific. (Suffered rather severely from disease in West of England in 1917.)

Arran Chief.—One of the most satisfactory croppers with allotment-holders.

Beauty of Hebron.—Prefers dry weather, but does well on all but stiff soils.

Up-to-date.—A good all-round variety.

Langworthy.—Not an abundant cropper, but grows free from scab.

Main-Crop.—A good variety for any soil.

If the grower makes his selection from the above list and has the ground in a good friable condition, he will have attended to the first two necessary conditions for producing successful crops. On one point connected

with these preliminary matters we must lay stress ; it is a wise plan to introduce fresh seed to the plot every alternate year, and English growers will be well advised to select Scotch seed when they make a purchase. The Board of Agriculture says :—

“ That Scotland affords a good change of seed for England is undoubted, but why this should be so is not quite clear. A number of influences are probably at work. The growth of potatoes in many parts of Scotland is frequently interrupted by autumn frosts, and the crops are lifted before they are as well matured as the crops in many parts of England. Now, if the foliage of potatoes is damaged by frosts or some other influence before the tubers have attained their full size there will be fewer big potatoes in the produce, and consequently a better selection of seed will be possible. In other words, a farmer will be using for seed a certain proportion of tubers which, had they had time to reach their maximum growth, would have passed to the market as ware or saleable potatoes. It is possible that a big potato has more ‘ constitution ’ than a small one, consequently, a small potato not yet arrived at its full growth—in brief, immature—may contain more innate vigour than a small yet fully matured potato that may have been the produce of a weakling. Granting, then, that the proportion of ware is greater in English than in Scotch-grown crops, it is only reasonable to suppose that the proportion of stunted weakling tubers is greater in English-grown seed. Moreover, the proportion of such tubers will tend to increase from year to year, since the practice of retaining small potatoes for seed insures that practically the entire produce of weakly plants falls into the ‘ seconds ’ or seed-size class.

“ This may to some extent explain why in England it becomes necessary to change the seed so frequently and why Scotch seed does so well in England. There is yet another

point, however. In spring the Scotch seed is slower in sprouting than the English, and therefore runs less risk of damage."

Sprouting.—Whilst the ground is being brought into proper condition the seed potatoes should be sprouted. About Christmas time a supply of shallow boxes is obtained and leaf mould, sand and good dry earth placed to the depth of one or two inches over the bottom of them. This is not essential but advisable. Then the sets (*i.e.*, the seed potatoes) are loosely stood upright in the mould, the thick ends upwards. The boxes are stored in a light, well-ventilated but, above all, frost-proof place, where the seed should gradually become green and eventually commence sprouting. When a considerable number of boxes are used they may be stood one above the other, but the air must be able to circulate freely amongst the tubers. This condition is obtained by nailing pieces of wood to the boxes so as to make the ends two or three inches higher than the sides.

Planting.—The time of planting the sets is somewhere between mid-March and early May, but the actual date depends more upon the condition of the soil than the calendar. On no account may the planting be done in cold wet ground that is lumpy and heavy.

When a suitable day has arrived the sets are carefully examined; any that have not sprouted are rejected, and all but two or three shoots rubbed off the others. Then trenches are dug and the tubers with their delicate shoots carefully placed upright in them. The earth is drawn back into position and levelled. Early potatoes are planted 4 inches below the ground, 12 inches between the sets, and 20 inches between the rows.

Other varieties require to be placed 4 inches down, 15 inches between the sets, and 25 to 30 inches between the rows. These distances must be taken as the minimum ; more room for each tuber may well be given where space is not valuable. The quantity of seed required for each rod is about 14 lbs.

Some gardeners do not place their sets in trenches, but drop them in holes made with a dibber. This is not a good plan to follow unless the ground is extremely light and sandy. If it is at all heavy or contains clay the potato will not fall to the bottom of the hole and the space left below it becomes a receptacle for water, which will rot the tuber.

“Should a large seed potato be cut so as to provide two or more sets ?” This is a question which the novice often asks. The answer, especially in these hard times, is in the affirmative, if the tuber can be so cut that each portion is provided with two or three strong healthy shoots. Lime, however, must be dusted on the cut surfaces, and it is wise to plant immediately after using the knife.

Not only should large potatoes be cut as a measure of economy, but good crops have often been grown from potato parings. Here is what a writer says in *The Daily Mail* :—

“In April I took the eyes, with a small piece of flesh, from eight Queen Mary potatoes—forty-eight in all. In May I planted forty-seven of these in light ground, treating them exactly as I did my other potatoes. Two failed to germinate. Yesterday I lifted the forty-five roots and I have 48½ lbs. of potatoes, the largest weighing 8½ ozs., and many weighing 4 and 5 ozs. each. Other potatoes on the same ground are only averaging 1¾ lbs. per root from the whole sets.”

The potato grower's labours are not completed when the tubers are safely in the ground. In the early days of their growth he needs to watch for signs of frost, and if any of the tender green shoots have pushed through the surface and cold nights come along he must afford protection by drawing the earth over them or by providing a blanket of straw. When the shoots begin to rear themselves up above the surface, the ground must be hoed and ridged, and this process requires repeating as the plants increase in height. The ridges must be pointed at the apex and not flat-topped (see Figs. 7 and 8 on Plate 9). Later the grower must decide whether one or more applications of artificial liquid manure are necessary, and lastly, he will have to spray the haulms twice in the season. All these necessary operations make great calls upon his leisure moments, but the time is well spent if a profitable crop results.

Lifting.—Sometime in September the late varieties should be ready for lifting, but as long as the leaves are green and the haulms seem healthy there is no particular need to get them out. Early tubers are usually dug when the grower's curiosity reaches its climax, or when the housewife's pleadings for new potatoes can be resisted no longer. Lifting should be performed in dry weather, for then the tubers will be clean and not clodded with earth. They need exposing to the air for a day or two—but not long enough to turn them green—before being stored away in the dark.

Storing.—There are two or three ways of storing potatoes for winter use. Where the quantities are small it will be a good plan to line a box or barrel with dried

bracken or straw and pack them carefully in this, previously dusting lightly with lime. Another way is to arrange them on the floor of a dry frost-proof shed, covering them with sacking ; but the most satisfactory method is to make them into a clamp.

To construct a clamp, a dry sheltered spot in the open is chosen. The spot is strewn with small cinders to the depth of an inch and these are covered with a layer of straw. Upon this the potatoes are arranged in a heap, shaped as shown in Fig. 8, Plate 9. When the potatoes are in position a five-inch covering of straw is placed around them which, in turn, is enveloped in a five-inch layer of earth. All along the edge of the clamp a trench must be dug for drainage purposes, and two or more ventilating shafts may well be provided by building up the tubers and piling the earth around chimneys made of tight bundles of straw. Guard against frost and over heating ; also take care that no damage, diseased, or damp specimens are assembled in the mound. Of course, it will be highly unwise to erect such a store on an allotment to which the public have easy access.

Diseases.—The potato is heir to almost as many diseases as afflict mankind, but the most deadly of all is that which is popularly called *Blight*. The appearance of this ailment is too well known to need more than a brief description. Dark brown spots appear on the leaves or stalks and spread with incredible rapidity. If the weather be wet these spots are extended until almost the whole of the foliage collapses and blackens. If the under surface of a spot be examined a delicate white mould may be seen (especially around the margin). This mould consists of the spore-bearing filaments of a fungus

known as *Phytophthora infestans*, the main part of which is to be found inside the attacked tissues of the potato plant. The external mould is merely its reproductive portion, developed by the parasite at the expense of the nutrient material absorbed from the cells of the host which it destroys.

"The aerial spores of the fungus are borne on these branched filaments and are exceedingly minute. They are produced in vast numbers, and are scattered from one plant to another and from field to field by wind or other agencies. As every spore brought into contact with a damp potato leaf is capable of starting a new centre of infection, it will be readily understood that under favourable conditions the disease spreads rapidly. The disease is seldom conspicuous before the end of June or even the middle of July, although careful search may reveal its presence on a small scale somewhat earlier. The severity of the attack and the rapidity of its spread is entirely dependent on the nature of the season. In a dry season it may hardly be noticeable, except to a careful observer, but in damp weather it spreads readily. In a warm, damp July or August the disease often spreads rapidly, and whole fields may be blackened completely in the course of a few days. In most seasons the blight is prevalent to some extent in September and October, and it usually causes somewhat premature decay of the foliage.

"The spores, which are produced chiefly on the under sides of the leaves, fall to the ground, are washed down into the soil by rain, and thus reach and subsequently infect the tubers of the new crop. From the spores germ-tubes are produced which penetrate the skin of the tuber, and from them mycelium (spawn) develops within the tubers and kills the cells.

"A potato tuber infected with the blight fungus at first

shows nothing but a slight darkening of the skin over the affected area. Soon, however, this area becomes somewhat sunken and of a leaden colour. When cut open the diseased tissue shows a rusty or foxy-red appearance which is at first confined to the skin region, but which gradually penetrates deeper and deeper until the whole tuber is destroyed. When a tuber is destroyed by *Phytophthora* alone the decay is of the nature of a dry rot; but when (as is much more often the case) other minute organisms follow, wet rot often sets in.

"If slightly diseased tubers are planted in spring, the mycelium continues its development and the majority rot completely in the ground without producing any plants. The remaining few grow and give rise to plants of varying degrees of vigour, and, unless they are infected independently later on, most of these remain quite healthy. On the other hand a very small proportion of these may produce above ground one or more diseased shoots bearing the fungus in its fruiting condition. Such primarily diseased shoots bearing the aerial spores of the fungus and derived from affected tubers have been shown to be centres from which the new crop may become infected. Great care should, therefore, be taken to plant sound 'seed.' Infection of the crop may also occur from spores borne on diseased sprouts or shoots of diseased tubers which have been discarded during winter or spring from pits, clamps, or other stores, and have passed the winter anywhere in the open without having become completely killed. Care should, therefore, be taken to destroy or bury deeply all such useless tubers." *

The only way to prevent this disease is to spray the haulms before the plants become affected. This is done with a very poisonous solution known as Burgundy mixture, which may be purchased in small quantities at

* Board of Agriculture, Leaflet 23.

most chemists or prepared in large supplies according to the following directions drawn up by the Board of Agriculture :—

“ A paraffin barrel of forty gallons capacity will form a convenient mixing vessel. The materials required for the preparation of a 1 per cent. or dilute Burgundy mixture are as follows :—

4 lb. copper sulphate (Blue-stone).

5 lb. washing soda.

40 gallons water.

“ After thoroughly washing out the barrel, thirty-five gallons of water should be poured into it. The copper powder should then be placed in a canvas bag, which should be moved about in the water until the copper is completely dissolved, or, better still, should be suspended just beneath the surface of the water in the barrel overnight. The washing soda should be dissolved in a separate vessel in the remaining five gallons of water. The solution should then be poured slowly into the copper solution, stirring the mixture vigorously and continuously. If preferred the two solutions may be prepared in advance and kept separately for some time, but when once mixed the mixture must be used immediately, for if it is allowed to stand any length of time its fungicidal properties deteriorate rapidly.

“ Before using the mixture it is advisable to test it with litmus paper which is obtainable from any chemist. Red litmus paper should just turn blue when dipped in the mixture. If it remains red, more soda solution should be added till, with a fresh piece of litmus, the blue colour appears. The mixture must be thoroughly stirred when adding the further quantity of soda solution before being re-tested.

“ When filling the spraying machine the mixture should be strained through very fine wire gauze. The machines should be provided with nozzles giving a fine misty spray,

and so adjusted as to direct the spray, from below, upwards, so that both the lower and upper surfaces of the foliage may become coated with it. Spraying should be carried out if possible during dry weather, preferably in the early morning, and not in the glare and heat of the mid-day sun. When once the mixture has dried on the foliage it adheres well. Should heavy rain fall before this occurs, most of it will be washed off and it will be necessary to spray again.

"One application only will seldom be a sufficient protection for the crop for a whole season, and two or three sprayings at suitable intervals may be necessary. The best results are obtained when the spray is applied immediately before a period of wet weather.

"It is important that the first application should be made before the appearance of the blight. The actual date will vary somewhat for different parts of the country and will also depend to some extent upon the weather conditions. In early districts it will be advisable as a rule to spray for the first time in the first or second week of June, while in other districts spraying may not be necessary until two or three weeks later. The second application should be made two or three weeks after the first; this will protect the new foliage which has been produced in the interval. In wet seasons or wet localities a third spraying will be necessary about three weeks after the second.

"For the first application the mixture should be applied at the rate of 100 gallons per statute acre; for the second and third sprayings, 120 gallons per acre must be used."

Other points to remember when spraying are :—

- (1) The operator should stand so that the wind does not blow the spray on to him.
- (2) The work should not be done with cut or scratched hands.
- (3) Spraying must be performed with the utmost care

when rows of cabbages or other edible greens are growing between the lines of potatoes.

Since it has been shown that blight is carried on from season to season through affected tubers, it is most important that only those which are free from disease should be selected for seed. At planting time the "seed" should be examined and all showing the least sign of disease rejected. When conditions allow, it is preferable to sprout the "seed" in boxes, as suggested above. The use of such sprouted seed has been found to result in an increase of about two tons per acre in the crop. Steeping the "seed" in a solution of copper sulphate or other fungicide with a view to killing the fungus is of no practical value in preventing the disease and is likely to damage the seed tubers.

Blight is but one of the diseases which the potato grower must combat. The others, though they are often of a highly destructive character, are found with less frequency and, accordingly, space cannot be devoted to describing them in this work. The reader who desires information regarding them is referred to the following Board of Agriculture leaflets :—

Leaflet 105.—Wart Disease.*

- ,, 117.—Black Leg.
- ,, 127.—Stalk Disease.
- ,, 137.—Scab.
- ,, 193.—Winter Rot of Potatoes.
- ,, 197.—Dry Rot or Winter Rot.
- ,, 232.—Corky Scab.

* Allotment-holders are constantly told that the police regulations require them to notify the presence of potato disease on their plots. Blight is *not* a notifiable disease, but wart disease or black scab is, and must be duly reported.

CHAPTER XIV

THE ONION FAMILY

Onions.—The chief point to note in growing onions is that all the members of this useful family require a deep rich firm soil for proper cultivation. It is true that even a poor bed or plot will grow these edible bulbs, but where fair size and quality are considered essential the ground must be exactly as stated. A deep rich firm soil, we mentioned, is necessary. Depth may be provided by removing the top spit and well forking the under one. This will give the delicate hair-roots all the opportunities they need for pushing their way deep down into the soil in search of moisture and nourishment. Richness and firmness are brought about by a sensible combination of digging, manuring and beating down. In autumn the ground is well dug and ridged so that after the frosts it is friable and not lumpy. This will ensure correct aeration. To get firmness not only on the surface but throughout, which is what onions require, we must work in a manure which is binding, such as pig or cow manure. If, of course, the land is of clay, it is too firm already, and then we must lighten it somewhat by the addition of ashes, soot, and long strawy manure. A finish is given to the bed by beating it down with the back of a spade, by treading, or by pressing with planks. This work must be performed when the ground is fairly dry, or it will prove extremely messy. The beating or treading

process alone, it is thus seen, is not sufficient to give the requisite firmness—it is the beating or treading *plus* the use of a binding manure. Some gardeners sow their seed on undug land, arguing that as it is firm it will answer the purpose. In most cases such plots will serve but poorly, as aeration, drainage and easy penetration of the roots, necessary qualities for proper growth, are considerably hindered.

Early in March or towards the end of February, if the weather is fine and the ground fairly dry, rake over the bed until the surface is quite free of stones and even small lumps, then press it down as suggested above. Next, run a stick along the surface and thus make a shallow drill about three quarters of an inch deep. Take a handful of powdered charcoal or soot mixed with fine rich soil and sprinkle it along the drill, half filling it. Then put the seeds in, not too thickly, cover over with soil and press down the earth gently. The performance is repeated until the whole bed is drilled and sown in this way. A space of about six inches should separate the rows.

In a short while, when the seedlings are three inches high, they must be thinned, leaving from four inches to a foot between them, according to whether the varieties are of medium or large growth.

As soon as this has been done, the hoe should be run between the drills, chiefly with the idea of scratching out weeds, for onion beds are extremely prone to the weed habit. Hoeing may well be repeated once a week.

Whilst the seedlings are still young, growth may be hastened by applying equal quantities of sulphate of ammonia, superphosphate, and steamed bone flour. (A half an ounce of each per square yard.)

Where the soil is liable to become dry and crack in hot weather an application of salt is very useful. Occasionally dustings with stale soot are necessary for checking pests. Onions cannot "bulb" without copious supplies of water, so during periods of dry weather we must use the water-can. Many growers save all the dirty scullery water containing soap-suds and soda and flood their onion beds with this. The procedure undoubtedly helps to plump out the bulbs, but it is one that everybody would not care to follow.

- In the early autumn the onion tops should be twisted and bent downwards to check seed production (Plate 10, Fig. 1). Later on, when they have changed from green to brown, they are ready for pulling. Do this with the utmost care as a damaged bulb is of no use for storing.

When the crop has been lifted the onions must be dried. If the weather is fine place them on a tray in the open for about three days, bringing them indoors during the nights. A very useful tray for this purpose can be made by constructing a frame of four pieces of stout wood and stretching small-meshed wire netting over it. See that the netting does not sag on the ground when loaded with bulbs. On this tray the onions will dry speedily, after which they may be stored on shelves, or they may be roped together and hung to the roof of a dry shed.

Damaged specimens or those which have thick green necks will not keep and should be taken to the kitchen for immediate use.

To rope onions, take a length of string and some twine. Hold the bulb at the bottom of the string and bind up

the neck by means of the twine. Proceed in this way and work upwards.

If space can be found for an onion bed in late summer or early autumn, it is more profitable to sow the seeds then than to leave them until the following March. Sow in ground prepared as before but aim at getting the crop sufficiently sturdy to be able to withstand the trials of winter. Hoe as soon as the lines are distinguishable, but when the weather is inclement do not turn in wet, cold surface earth, merely scratch away the weeds. Use soot liberally. Thinning out may be left until March, when the seedlings that have been torn up will be useful as spring onions. Many allotment-holders and gardeners are not prepared to risk their seeds and time on an autumn sowing and yet they may be desirous of raising as early a crop as possible. They will do well to sow thickly in shallow boxes in January. Use a light soil and keep at a temperature of about 60°. In April transplant the seedlings to the prepared bed. Be careful to disentangle the root hairs of each seedling without damaging them and, when placing them in the earth, see that they are not pushed in carelessly but spread out naturally.

Varieties of onions are numerous. For spring sowing : *Bedfordshire Champion* and *James's Keeping*. For autumn sowing : *Ailsa Crag*, *White Emperor*, and most of the *Tripoli* kinds. For autumn sowing and using as spring onions : *White Lisbon*. For pickling : *Silver Skin*.

Chives.—These are a useful substitute for spring onions, being more profitable, and, if anything, easier to grow. They are either propagated from seed, being sown

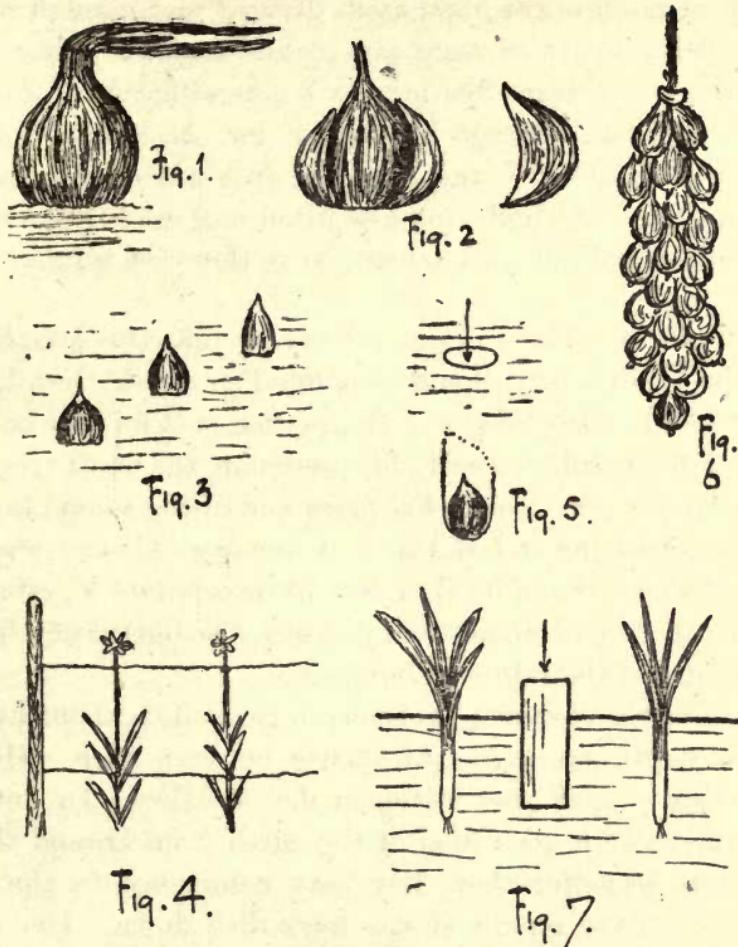


PLATE 10.—Hints on Growing Onions. Twist the tops of onions in the early autumn. This will assist the ripening process (Fig. 1). Fig. 2 shows the cloves of garlic. Fig. 3 indicates the depth to which shallots should be planted. Do not place them deep down as in Fig. 5. Fig. 4 shows a method of supporting tree onions. Fig. 6 shows how onions should be stored. To assist the rapid growth of leeks, pour manure water through the pipe, as indicated by the arrow in Fig. 7.

in mid-spring in shallow rows, lightly covered with fine soil, or clumps are purchased, divided and planted out six inches apart in rows ten inches asunder. Two or three rows, a dozen feet long, will give sufficient produce to supply an average household, for the stems, only, should be gathered, and they will grow afresh when cut. In autumn, the bulbs may be lifted and used as onions. Conditions of soil, etc., are similar to those set out above.

Shallots.—There is an old saying that this member of the onion family should be planted on the shortest day and lifted on the longest. In practice, we find that both dates are a trifle too early for producing the finest crops. Planting is best done in February and lifting should take place about the end of July. A fine dry soil is required for shallots, therefore it is well to incorporate a certain amount of small cinders with the bed, also liberal supplies of soot and the refuse of bonfires.

Insert the cloves or divisions in the soil to about half their depth, leaving eight inches between each. Hoe constantly and give water in dry weather. In June scrape away a good deal of the earth from around the clusters in order that they may commence to ripen. Lift when the middle shoots have died down. Dry as suggested for onions and store on shelves, not heaped up but spread out thinly. Each clove, it may be useful to add, produces about nine or ten shallots.

As shallots, in their early stages of growth, throw out a bunch of delicate green stems which possess a certain artistic bearing, it is by no means a bad plan to grow the divisions as borders for ornamental beds or scatter them among the flowering plants. It is highly necessary,

however, that they should not be confused with certain similar looking but poisonous bulbous plants when lifting.

Garlic.—This is a vegetable of which a little goes a long way, so the average grower will not need to arrange for more than one or two rows. Crops may be raised from seed, but propagation is usually carried out by means of cloves (see Plate 10, Fig. 2). When this method is adopted the rules set down for shallots will serve, but planting is well postponed to March, and frequently the matured bulbs will not be ready until the first week in September. Tie the long thin stems in knots, during July, to arrest the formation of seed heads.

The Potato Onion is seldom worth growing except on land where ordinary varieties of onions are known to fare badly. Cultural notes are similar to those set down for shallots.

The Tree Onion (see Fig. 4, Plate 10) is a curiosity of the allium family which produces onions as offsets to the roots as well as bulbs on the stem, both kinds being edible. Propagation consists in planting the stem bulbs two inches down, four inches apart, in rows separated by eight inches, or planting the root bulbs one inch down, twelve inches asunder, in rows a foot apart. This should be done in March or October. Support the plants on becoming leggy by means of stakes, and gather the bulbs when fully ripe and perfectly dry.

Leeks.—This member of the onion family is of considerable value as it gives supplies in winter when all its close relations have ceased growing. Culture depends upon the quality of produce which is expected. If leeks of the size of spring onions are deemed useful, and they

prove very acceptable for flavouring soups, etc., all we need do is to sow seeds in March and transplant them in September. From December onwards they will be ready for pulling.

Where more ambitious results are desired, the seeds must be sown in a bed in February and pricked out in their permanent quarters when they are about five or six inches high. The soil of this latter plot should be rich and not too dry. Trenches are thrown up about a foot wide and equally deep. The bottom layers are well mixed with cow or horse manure and fine earth is used sparingly as a covering. Into this the seedlings, trimmed of their longest leaves, are placed and, as they grow, the earth is drawn up around them to permit of blanching. When well established the leeks should be provided with copious supplies of manure water. A good way of supplying this is to run a pipe, six inches long, into the ground between each pair of plants (Plate 10, Fig. 7). The liquid manure is then poured through the pipe and speedily finds its way to the roots where it is most needed. Frequent draughts of plain water are also necessary.

Where trenches cannot be conveniently dug, good results may be obtained by plunging a crow-bar or broom handle into the prepared ground, inserting one of the seedlings, and dosing with water. The produce obtained in this way will not be so large as obtained by trench culture, but it will, nevertheless, be of a useful nature.

Two pests, in particular, attack the onion family. The first, the *Onion Fly*, causes the longest leaves to turn yellow and, later, white. On pulling out a leaf from the bulb of an infested onion, it comes away easily. The

bulb itself is found on examination to be undeveloped, badly shaped, and crowded with dirty white maggots, which feed on it and cause it to become rotten. Sometimes, the outer leaves fall to the ground whilst the inner ones are soft and flabby.

The Board of Agriculture writes as follows with respect to this fly :—

“ (1) Spraying onion plants with offensive compositions is a good way of preventing infestation. Paraffin emulsion is as good a compound as any for this purpose. It may be made by thoroughly mixing together three pints of paraffin and a half-pound of soft soap with a gallon of boiling water. This should be applied early in the season when the onions are quite small. Spraying should be repeated twice or thrice, especially if heavy showers fall after the process.

“ (2) Another preventive measure is to mix sand with a little paraffin and place it at the base of the onion plants or work it into the soil.

“ (3) Sprinkling the onions with soot may be adopted with advantage where the seeds are sown broadcast.

“ (4) Where the seed is sown in drills or shallow trenches egg-laying may be prevented by earthing up the neck of the onion plant.

“ (5) When onion plants are noticed to droop and wither, all such plants should be taken up and burned, or placed in quick-lime.

“ (6) Wherever it is possible, onions should not be grown again, for at least one season, on land where this crop has been infested, as the puparia remain in the ground during the winter. All fragments of bulbs should be removed from infested land, as the larva occasionally pupate in the bulbs.”

Of the *Onion Mildew* the Board states that—

“ The first sign of the disease is the appearance of small, scattered, yellowish patches on the leaves. These patches

gradually increase in size and blend with each other, until finally the entire leaf presents a sickly yellow appearance and becomes thickly covered with a white powder. This has the appearance of hoar-frost, but soon changes to a dingy lilac colour.

“ During the early stage of the disease the fungus exercises a very marked stimulating effect on the growth of the onion. This is shown by the rapid increase in length of that portion situated between the top of the bulb and the base of the leaves. This abnormally elongated portion is spoken of as the ‘ neck,’ and the presence of this is a certain sign of the existence of the disease.

“ All plants showing a trace of disease should be removed or burned, and the healthy surrounding plants, or preferably the entire crop, should be dredged with a mixture of powdered quick-lime and sulphur in the proportion of one of lime and two of sulphur. The dredging may be done by placing the mixture in a muslin bag and shaking it over the plants, or by specially made bellows or other contrivances now on the market. The work should be done when the plants are covered with dew.

“ It is very important that, as far as practicable, every trace of diseased onions should be collected and burned and not thrown on to the manure heap or into the piggery. If such are allowed to decay on the land, a recurrence of the disease is almost certain, as a second form of fungus fruit is produced in the decaying tissues of the leaves. This fruit remains unchanged until the following season, or, if deeply buried, may remain so for several years, and when again brought to the surface in the ordinary routine of cultivation germination takes place, and, if onions happen to form the crop, infection follows.”

CHAPTER XV

CARROTS, PARSNIPS, AND BEETROOTS

Carrots are one of the most satisfactory crops to grow, for they do not take up a great amount of room, they require but little attention, and are most acceptable vegetables for culinary purposes.

The space selected for their growth should be where the potatoes stood in the previous season which, as the reader will see by reference to the chapter dealing with them, was well manured. This ground thus contains a supply of matured or partially spent manure which is what the carrots require for proper cultivation. Some growers are tempted to dress the ground prior to sowing, hoping that the crop will benefit thereby, but as this leads to forked and otherwise mis-shapen roots it is not a practice to be recommended.

The soil which carrots prefer is sandy loam. In this they will thrive well, especially if the situation is one that benefits by much sunshine. Where the crop must be grown on heavy ground it is a good plan to make deep holes with a dibble or rod, fill them with a mixture of sand, powdered peat, wood ashes and old soot, and then place a seed or two in each of these compartments.

The carrot bed must be dug deeply and raked so that the surface is composed of nothing but fine earth. If fair-sized stones and lumps of mould are present the tiny

seeds will not be properly covered after the final raking, and thus germination will not proceed properly. The seeds are sown early in April, half an inch down, in rows about nine inches apart. It is a good plan to sow on the same day both an early and a main-crop variety in alternate rows. In this way the earlies will all have been pulled when the main-crop begins to require plenty of space. Mix the seed with fine sand and sprinkle it along ridges made by drawing a broom handle across the plot, then rake over. Be careful to spread it out evenly and not close together; a quarter of an ounce should be sufficient for a hundred and fifty feet of rows.

Two thinnings are usually necessary: the first when the carrot leaves are large enough to handle, and the second when the carrots are as thick as a pencil. The first batch must be buried or burnt so as not to attract the carrot fly; the second are well worth eating. Press the ground firmly around the plants which are left in the plot, and see that no part of the roots is left uncovered. The carrots should finally be nine or ten inches from each other.

Early Nantes and *Short Horn* are two good early varieties, whilst *Long Red Surrey* and *Telegraph* may be recommended for the main-crop.

Carrots need lifting towards the end of September, before the slugs do them injury or the frost makes its unwelcome attacks. Remove the stalks, rub off any adhering earth, dry them in the sun for a day or two and then store in boxes, packed with sand, or in clamps, as described for potatoes.

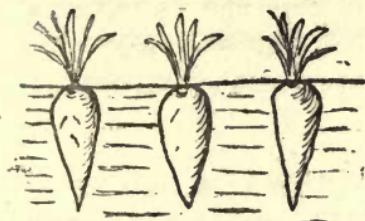


Fig. 1.

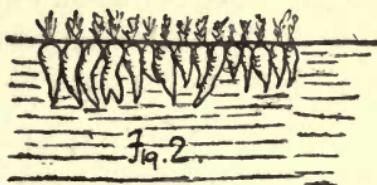


Fig. 2.

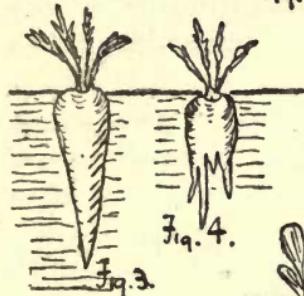


Fig. 3.

Fig. 4.

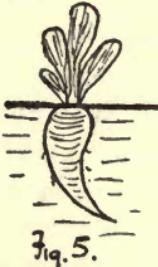


Fig. 5.

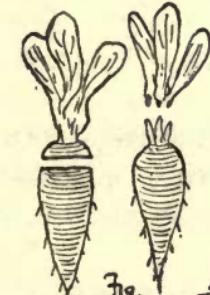


Fig. 6.

Fig. 7.



Fig. 8.

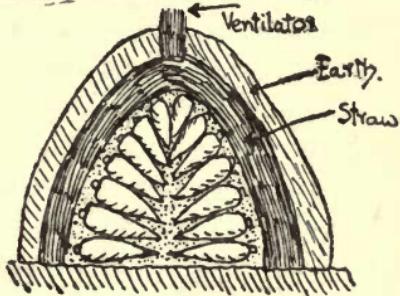


Fig. 9.

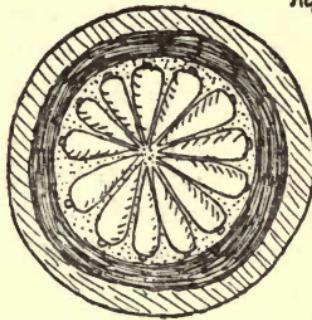


Fig. 10.

PLATE 11.—Hints on Growing Carrots, Parsnips, and Beetroots.

Fig. 1 shows the fine specimens obtained as a result of proper thinning, whilst Fig. 2 depicts the results which accrue from a neglect of this operation. Good shaped specimens are obtained by deep digging (Fig. 3), but poor specimens when shallow digging is practised. Fig. 5 shows a distorted root. Such produce comes of planting out in holes that are too small. Do not cut off the heads of beetroots (Fig. 6), but twist them off (Fig. 7). Also do not pull them out of the ground. Dig or fork them up (Fig. 8). Figs. 9 and 10 show a clamp suitable for carrots, etc.

The *Carrot Fly* causes much destruction to this crop, boring into the roots and otherwise injuring them. The preventive measures adopted to overcome this pest may be tabulated as follows :—

(1) When it is noticed that the tops of carrots change colour, prematurely, the roots should be examined, and those that are infested must be forked up so that no part of them is left in the ground, and destroyed. This will prevent further infestation.

(2) If the flies are seen on or near the carrot plants these should be sprayed with paraffin emulsion. The emulsion is made thus : Dissolve half a pound of soft soap in a gallon of boiling water ; while this is still boiling pour it into two gallons of paraffin, and churn thoroughly until a butter-like mass results. If this be well made it will keep for a long time. For use, dilute with twenty parts of water. This emulsion can be distributed by means of a knapsack machine.

(3) The following has proved an excellent preventive measure : Spray the carrot bed, after sowing, with the paraffin emulsion, spraying again after germination, and a third time after thinning.

(4) In places where these flies cause injury coal ashes, sawdust, sand, or wood-ashes, impregnated with paraffin oil at the rate of from three to four quarts per cwt., may be put into the drills with the seed.

(5) Pressing the earth close round the stems tends to prevent the flies from egg laying. This may be done immediately after the plants are thinned.

(6) Heavy watering of the crop after thinning tends to consolidate the soil, and so wards off an attack.

(7) Sand or ashes, impregnated with paraffin or carbolic acid, may be scattered over the plants at thinning time to keep the flies from them. The great object must be to

prevent the flies from laying eggs on the carrots, and for this purpose offensive substances such as soot, earth, ashes, or sand sprinkled with carbolic acid, might be applied as soon as the plants are well established.

(8) It is a matter of common observation that carrots which have sprung up singly on paths and the like from seed accidentally dropped are seldom attacked. Apparently the operation of thinning is, in many instances, the predisposing cause of attack, and this has led some growers to sow the seed very thin and so avoid the artificial thinning of the crop.

(9) In localities where the attack of the fly is very prevalent a supply of carrots can usually be maintained (*a*) by sowing such early varieties as French Forcing in a sheltered position as soon as the soil and weather permit in February or March, for early use, and (*b*) by deferring the main-crop sowing until mid-July, choosing the Early Horn variety, which will grow sufficiently large for storing for winter use. The plants from the first sowing develop before the egg-laying period of the fly, whilst egg-laying is over before the plants from the late sowing appear above ground. (Information supplied by the Board of Agriculture.)

Parsnips require much the same kind of ground as advised for carrots, but they need deeper working. Special attention should be paid to the lower spits, but the subsoil must not be brought to the surface. The ground, in ordinary cases needs no addition of manure, but, if it is considered exceptionally poor, a slight quantity, well rotted, may be incorporated with the lower strata. The surface of the ground is then left in high ridges until seed time, which, in ordinary seasons, is somewhere about the end of February. If the ground is very hard and wet at this time, defer sowing for a while, but as parsnips

require a long season of growth the first favourable opportunity in March should be seized for getting them in.

When conditions are suitable, rake over the plot, get rid of stones and lumps of earth, draw drills eighteen inches apart and half an inch deep and sow thinly. The seeds are large enough to handle comfortably, and consequently, there is no excuse for sprinkling them unevenly. One ounce will be sufficient for three hundred feet of rows. Germination takes a long time with this vegetable, usually from thirty to forty days before any appearance is made of the green shoots, so the uninitiated grower must not become anxious if his parsnip plot does not show up in the early stages as well as, say, the adjoining turnips. As parsnip seeds do not retain their growing qualities for more than a year, it is advisable to buy supplies from reputable dealers who guarantee their stock.

When sowing, put three seeds at every foot along the rows, placing them in the form of a triangle having one-inch sides. When the seedlings have shown through the ground the best and most sturdy specimen of each trio is left and the others pulled carefully out. The ground is then made firm, hoed occasionally and dressed from time to time with soot.

There are many varieties of parsnips which, with suitable cultivation, give giant roots, but as this vegetable should not be cut previous to cooking if the full flavour is to be retained and, as large, uncut roots are difficult to fit into saucepans, it will be seen that the medium-size varieties are the best for most people to grow.

The *Student* may be recommended where medium roots are desired; other good growers are *Carters' Holborn Marrow*, *Hollow Crown*, and *Improved Jersey Marrow*.

The parsnip does not reach maturity until late autumn, but as frosts do not injure it, in fact, their influence on the roots is rather beneficial, there is no need to be anxious of the harvest. It may be left in the ground until required for use if a covering of straw is placed over the crowns which we intend to dig up during the hard weather. Where the ground is wanted for another crop parsnips may be lifted and stored in the same way as carrots. The chief pests which attack them are :—

(1) *The Celery Fly*.—The larvae of this fly burrow in the leaves and cause white patches to appear, which soon turn brown. Spraying the young plants is the best preventive. Use a mixture of paraffin, soft soap, and water at the rate of a quart of the paraffin and a half pound of soap to ten gallons of water. Later, the fully developed leaves should be showered with the liquid. Any parts of the foliage which are brown should be burnt, and when the plants are lifted it is imperative that the bruised leaves and stalks be thrown on a bonfire.

(2) *The Parsnip Canker* is a fungus which causes brown patches to appear on the skin of the parsnip. Healthy cultivation is the best preventive. A plot that has harboured the canker should be well limed when vacant.

Beetroots thrive on a light, sandy soil which was well manured for a previous crop, such as potatoes. They appreciate a slightly damper soil than is liked by carrots. Preparatory to sowing, the ground needs deep working in order that the roots may have full play. As with

parsnips, the large varieties should be passed over in favour of the medium varieties by the average grower. *Blood Red*, *Dell's Crimson*, and *Egyptian Turnip-rooted* may be recommended.

The seeds must not be sown too early—at the end of April or the beginning of May will be quite soon enough. Place them two inches down in threes, as suggested for parsnips, in drills fifteen inches apart. When thinned, the young seedlings should stand with nine inches separating them. Some gardeners transplant the seedlings, but though we have seen satisfactory crops produced in this way, it is not a practice which we can endorse as the slightest injury to the roots is more or less fatal.

Beetroots require a little more coaxing than carrots and parsnips, so it may be necessary to assist growth by means of some artificial manure. If such is deemed necessary, superphosphate and steamed bone flour, mixed, may be applied at the rate of one ounce to the square yard, immediately prior to sowing, and sulphate of ammonia (half an ounce to the square yard) is useful when thinning out. These artificials may be applied to carrots and parsnips, also, if the ground is not considered sufficiently fertile. Where the soil does not contain a moderate supply of moisture, beetroots appreciate the application of salt before sowing. (One ounce to the square yard.) Seaweed serves the same purpose.

Birds are very fond of the young leaves of the beet, and sometimes they strip the tender plants of all but the midribs. This, of course, arrests proper growth, but it will be easy to check these depredations by running threads

of cotton over and around the plants, fastening them, at the ends of the rows, to pieces of wood by means of projecting nails (Figs. 7 and 8, Plate 3). Slugs also attack the young beetroot. Sometimes a healthy plant will suddenly sicken and wither away. Pull it up and examine the root. In all probability it will be found that the slugs have nibbled through the fleshy part. To check these pests, sprinkle the bed with lime and soot, fork in the ingredients carefully, and then make the surface of the ground difficult to crawl over by the scattering of rough cinders.

Beetroots should be lifted in the autumn before the appearance of frosts. If the crop is large, store it in clamps; if it is small pack the roots in a box containing fine sand, in such a way that no two roots touch. Of course, it is hardly necessary to add that none but perfect specimens, the result of careful lifting, are worth preserving. The leaves, twisted and not cut from the crowns, make a useful addition of potash if worked into the potato beds.

It may not be out of place to mention that the delicate bronze foliage of this vegetable is highly ornamental and, therefore, the plants may well be incorporated in the flower beds; in fact, they make an artistic contrast to the usual green foliage.

CHAPTER XVI

CELERY AND CELERIAC

Celery is not a difficult vegetable to grow, yet few crops raised by amateurs prove less satisfactory. Why this is so we are at a loss to understand, but it is probably because this esculent requires regular and careful attention over a long period of the year.

The grower who wishes to have the satisfaction of placing nice crisp heads of his own rearing on the table between October and February should commence preparations early in March. The first requisite will be two or three shallow boxes. These are filled with some light rich loam and the seed is sown just below the surface. A sprinkling with the water-can may be necessary now and then, but, in the early stages, this should be given with caution. The boxes are placed in a warm greenhouse where they will get plenty of light or on a mild hot-bed covered by a garden frame.

When the seedlings are large enough to handle they are transplanted to other boxes where much more room will be available for them. Here they should make great strides, especially if kept close to the glass, moistened occasionally, shaded when the weather is warm, and given fresh air at times.

By the end of May, the grower should begin to make plans for bedding out and, in the meantime, it will be

well to commence hardening the tender seedlings. Do this by putting the boxes in the open for three or four days during sunny periods, afterwards placing them out during the less attractive parts of the day, and finally leaving them in the open continuously.

When able to withstand the extremes of day and night, the seedlings are planted out fairly closely in a plot of rich soil which enjoys plenty of sunshine. Here they must be watered daily and fed constantly, when established, with liquid manure and soot water.

In the meantime, trenches are dug to provide permanent homes for the young plants, preferably on the ground cleared of an early crop of peas. They should be a foot deep, twenty inches wide, run north and south and have a space of three feet between them. The disturbed soil should be piled up neatly between the rows, where such catch-crops as radishes, lettuces, and spinach may be sown. The bottom of the trenches must be well forked and mixed with a six-inch layer of rich animal manure, and then pressed firm. Afterwards a three-inch covering of good loam is placed over the manure in readiness for the celery plants.

When the preparations are complete, the choicest specimens in the seedling bed are dug up with a good ball of earth enveloping the roots. If the ground is dry, water it sufficiently to make the mould cling to the root formations. Then put the plants in firmly, nine inches apart, pressing the earth around the foot of the stalks with the knuckles. Never plant a ragged specimen, but trim away broken leaves, remove cracked stems, etc. It is very necessary to see that the new inhabitants of the trench do not flag soon after planting. Possibly

there will be a tendency for them to do this as the time will be somewhere close to midsummer. Where such happens, water in the early mornings and arrange sheets of newspaper to afford shade during the sunniest part of the day.

As the plants grow, give applications of liquid manure on alternate evenings, but do not let it touch the leaves. Once a week, after a fall of dew or an artificial watering, dust soot over the plants to discourage undesirable pests.

The first earthing up to blanch the stems may be effected in August. Tie the plant just below the leaves with raffia, but only make a single knot which the stems may gradually loosen as growth proceeds. Clean off all surface suckers, etc., and arrange a mound of earth up the sides of the plant. Do this when the ground is dry, and be most careful to see that no soil finds its way among the stems and reposes on the hearts.

A second earthing may be performed in a month's time, and a third early in November. The soil for these latter bankings may be taken from the sides of the trench, as the catch-crops will have long since disappeared. See that the earth is nicely arranged round the celery heads and that there are no pockets to catch the rain. Beat the sides firm with the back of a spade but do not injure the foliage.

Another way of blanching the stems, which is becoming more popular every season, is to cut some good tough brown paper of a non-spongy kind into lengths five or six inches wide. Tie an end to the bottom of a celery plant, using raffia, and wind it spirally upwards around the stems, binding the top with another piece of raffia. As growth proceeds, further pieces of paper must be wound

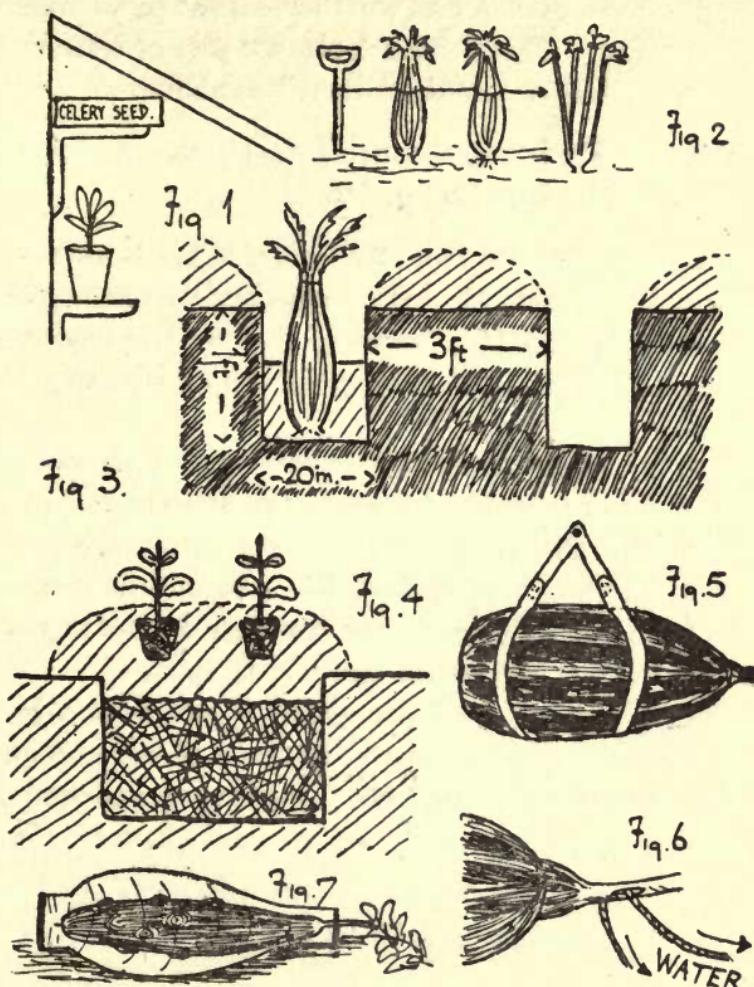


PLATE 12.—Celery, Vegetable Marrows, and Cucumbers. Force celery seed in boxes under glass and as close up to the glass as possible (Fig. 1). Tie up the celery as shown in Fig. 2, and plant it in trenches as shown in Fig. 3. Fig. 4 illustrates a vegetable marrow mound. Keep the marrows until the winter, strapped to the wall or ceiling of a dry room (Fig. 5). Provide copious supplies of moisture for the growing marrow (Fig. 6). Fig. 7 shows how cucumbers may be forced without any special apparatus.

on, and, after a spell of bad weather, all the paper bands need renewing. This is a much cleaner way of bleaching than the earthing-up method described above.

The Celery Fly is a most troublesome pest. A description of it will be found on p. 135.

Varieties :—The red and pink coloured kinds are most favoured for all but the earliest sowings. *Sandringham* is a good early white ; *Standard Bearer*, *Incomparable Crimson* and *Superb Pink* are good tinted specimens.

Celeriac is a turnip-rooted celery which should be grown more frequently by amateurs than it is, as it cooks without the stringiness of celery, is much hardier and need not be grown in trenches. Culture is exactly similar to that detailed earlier in this chapter, but instead of trenches it is grown on the flat in hard beds. In planting, place the seedlings about a foot and a half away, both along the rows and between them. Lifting may be carried out in October ; the crop keeps well in dry sand.

CHAPTER XVII

ARTICHOKEs

THERE are three kinds of artichokes which have little in common beyond their name. The first, the **Jerusalem Artichoke**, is probably the easiest thing a gardener can grow ; in fact, it flourishes so well without attention that it might almost be classed among weeds. In many ways it resembles a sunflower, being tall of habit and possessing similar shaped leaves. The stem, however, does not show the purplish-bronzed hue which is characteristic of the flowering helianthus.

The Jerusalem artichoke is grown for its tubers, which have a flavour somewhat akin to waxy potatoes, and consequently is not appreciated by everybody. Its food value almost approximates that of a potato, and as it requires no attention during the period of growth, and as the diseases which attack it are few there is a good deal to be said for its inclusion, in moderation, in every garden plot.

The ground selected for this vegetable should, for preference, be light and rich, but as it is highly accommodating in most soils the roughest and least useful plots are where it is commonly grown. If it is desired to hide a shed or screen some delicate plants, the Jerusalem artichoke will perform this service admirably.

The "seed" should be buried in spring to a depth of about six inches, with a space of some sixteen inches

between each. There are two main varieties, the silver and the purple skinned. Though the latter look far more attractive before being cooked, the former possess a better flavour.

In October, or in some seasons, a little later, the stalks begin to wither and the leaves become brittle ; then the tubers are ripe for lifting. Some growers leave them in the soil until required for the table—they are unaffected by frost—but if slugs are at all troublesome they will attack the tubers and utterly ruin them. For this reason it is wise to dig them up, storing them in dry fine sand.

It may, perhaps, be as well to point out that the Jerusalem artichoke reproduces itself persistently from even the smallest tubers. Consequently, it is necessary to dig the bed carefully in autumn and remove all root matter ; otherwise, the plants will increase and multiply until they have invaded the surrounding plots.

It is unwise to peel the tuber preparatory to cooking.

The **Chinese Artichoke** is not so commonly grown yet it is considered by many to be more of a delicacy. The part that is eaten is the knobbed rhizome which grows close to the surface of the ground.

The soil required by *Stachys tuberifera* is much the same as that mentioned for the preceding kind of artichoke. In spring the tubers are planted about three inches down and a foot apart. No attention need be given to them through the period of growth except an occasional feed of liquid manure and, if the roots are growing too close to the surface, an earthing up.

In October the bushy plant commences to shrivel and it is not until this process is complete that the tuberous

rhizomes are mature. It is much preferable to lift them as required, and this being so, the roots must be covered with litter in frosty weather in order that the ground may be kept soft.

The persistent encroachment of the Chinese artichoke upon surrounding plots, when the beds are not carefully cleared, is no less provoking than in the case of the Jerusalem tuber.

The Globe Artichoke has no connection, except in name, with the two preceding plants. Unlike them, it is highly ornamental and should be grown in places where it is desired to combine utility with decorativeness.

This artichoke is a perennial, but loses its vigour at the end of three or four seasons and should then be rooted up. Propagation is effected by means of seeds or suckers. The seeds are sown on a gentle hotbed early in March. In a few weeks the seedlings are transferred to small pots, are gradually hardened, and then given their permanent quarters in the open towards the end of May (three feet apart). Seeds may be sown out of doors in April, but they will not bear flowers or heads sufficiently large for culinary purposes until the following year.

Where plants are already growing it is more satisfactory to propagate from suckers than from fresh seed. In April the mature plants give off side shoots ; these should be carefully removed with as much adhering root-growth as possible and transplanted in beds, three feet apart. The outer leaves must be trimmed a little, the root-growth firmly pressed in the ground, and the spaces between the plants littered with a mulch of strawy manure. Heads will be ready by the autumn.

Other points to remember are : (1) A rich sandy loam containing plenty of humus and manure gives the finest results. (2) The ground must be kept fairly moist in the early stages of growth. (3) Manure water is occasionally necessary as growth proceeds. (4) Small side shoots should be removed from young plants. (5) Ashes may be incorporated in heavy and medium soils with good results. (6) The plants which are to remain in the ground all the winter need cutting down and, as they are not hardy, a covering of ashes or straw placed over them. (7) Manure should be forked into the soil around each plant during the winter.

CHAPTER XVIII

VEGETABLE MARROWS, SQUASHES, AND CUCUMBERS

THESE three vegetable fruits may be conveniently dealt with under one head as the culture which they necessitate has many points in common.

Vegetable Marrows are of prolific habit and, in consequence, are well worth the little care and attention demanded by them. The soil which they require needs to be richly manured, but this should be done at least a month or six weeks before bedding out. Early in April sow seeds, the wedge end downwards, one in each thumb-pot half filled with good soil composed of loam and leaf mould. Place the pots in a conservatory or frame where a temperature of about 55° can be maintained. As growth proceeds, add more soil to the pots, but do not ram it in, and place the receptacles close up to the glass to assist a strong growth. When the seedlings outgrow the pots place them in larger ones, using richer soil to fill up the surroundings. Towards the end of May find room for the pots in the cold frame in order that they may be hardened, and during June plant out in the open. If no suitable heat is available sow out of doors in May, but a later crop must then be expected.

The bed for vegetable marrows usually consists of a low mound. To prepare this dig out a hole about a foot deep and a yard square, half fill it with farmyard manure,

leaves, sods, turf cuttings, etc., and after making them fairly firm, return the dug out soil. This will give a raised bed standing about a foot above the ground. Flatten it with the back of a spade and gently incline the sides (Plate 12, Fig. 4).

When all is ready take two of the pots, shake out the seedlings with the soil clinging to them and plant on the surface of the bed. One plant is really sufficient to cover a bed of the dimensions mentioned above, but it is well to arrange two in case either of them fails.

During the first two or three weeks in the open station the seedlings will have a somewhat precarious existence ; accordingly, it is well to cover them at nights with bell jars, upturned aquaria, or large flower pots to protect them from frosts.

When the plants become established and growth commences to proceed apace, the points of the main shoots should be pinched off in order that the side ones may be better nourished. Later, these shoots are arranged along the ground in straight lines and not allowed to become entangled. Some growers train their shoots up a gentle slope to mount a wall or fence and thus catch more sun than would be otherwise possible. All the while, copious supplies of water will be necessary ; give this to the roots by means of a can from which the rose has been removed, but spray the flowers gently. Do not, however, flood the plants so that they damp off. Plenty of water is wanted, but not too much.

On the formation of the blossoms watch for the fruit. The early comers will need fertilizing ; cut off a male flower and smear it well into the centre of a female flower. Later bloom is usually fertilized naturally. As

soon as the fruit becomes apparent, give copious supplies of liquid manure and increase the draughts of water. When a fair size is reached place a sheet of glass under the marrow or the taste will be earthy. Personally, we prefer to cut the fruit when a medium size is reached, but there is a good demand for huge specimens. When such are required place a saucer of water by the side of a vegetable marrow and connect the water and the inside of the main stem by means of a three-ply rope of wool. The abundant supply of liquid quickly plumps out the fruit to enormous dimensions. (Plate 12, Fig. 6.)

There are many varieties to select from when sowing : *Custard* is a small type ; *Carters' Trailing White* is a quick grower ; *Pen-y-byd* (the best in the world) is for late culture, round in shape ; *Bush* or *Cluster* is useful where space is limited.

The Squash is a vegetable fruit more after the type of a pumpkin than a marrow. The cultural requirements of both are similar to those set out above for the marrow, but the squash requires more room, and the pumpkin much more room than suggested a few lines higher up. The squash and the pumpkin or gourd are little grown by the average amateur, yet they are an easy crop to rear and well worth undertaking. The squash may be used in late autumn or winter in place of the marrow, and many consider that its flavour is a trifle more sweet and aromatic. The pumpkin has, of course, figured in many fairy tales in the form of prodigious pumpkin pies, but, personally, we prefer a little pumpkin mixed with other fruit rather than a whole dish of this delicacy cooked by itself.

Squashes, pumpkins, and vegetable marrows keep well when stored, if a dry frost-proof place be selected. Cottagers often strap these fruits to the kitchen ceiling by means of broad pieces of tape, where they hang all the winter or until required. We do not suggest that the reader will be well advised to decorate his kitchen in the same way, but the idea of using tape instead of string is certainly worth following.

There are many forms of ornamental gourds which are grown for their beauty and not for edible purposes. The uninitiated should be careful when purchasing seed to see that what he buys will eventually provide him with table rather than decorative produce.

Cucumbers are well worth growing as long as other and more useful crops are not neglected in their favour. Seed is sown late in February or early in March when the fruits are to be reared on a hotbed, or towards the end of May when the rearing is to be effected in a cold frame or in open beds.

For culture on hotbeds place one seed in each small size pot, filled with a mixture of good loam to which has been added a fair proportion of well-rotted manure. Sink the pots nearly up to the rims in a hotbed constructed on the lines suggested in Chapter VI. and give plenty of air, daily.

When the seedlings show a few small leaves build two little mounds of good rich soil on the surface of the manure in each hotbed. Plant one seedling in each mound and sprinkle with lukewarm water. As growth proceeds pinch off the terminals of the main shoots in order that the laterals may develop and see that only one

cucumber forms on a lateral. All the time, water the whole of the plants lightly twice a day with luke-warm water and when the fruit commences to form give weekly supplies of liquid manure to the roots. Remember that proper growth cannot result unless light and air are supplied abundantly. Fertilization is as for vegetable marrows.

When the last cucumber has been cut fumigate the frame to kill off the spores of fungoidal growths and then plant late lettuces or scatter the manure upon the plots which we are about to dig.

For ridge cucumbers, which are grown in the open, prepare a bed about three feet deep, of good decayed manure and cover it with a layer of rich soil. Into this sow the seed three inches apart, wedge end downwards, and proceed as for hotbed culture. Where it is desired to promote a rapid growth, it will be a good plan to train the young fruit to grow into large colourless wine bottles or into cracked and disused lamp glasses. These serve as hothouses and do much towards speeding up the fruit-producing capacity of the plants.

Useful varieties are : *Improved Telegraph* and *Rochford's Market* for forcing ; *Carters' Best of all Ridge* and *Prickly Ridge* for open-air growth ; and *Gherkin*, grown out of doors, for pickling.

CHAPTER XIX

INDOOR AND OUTDOOR TOMATOES

BOTANISTS may tell us that the tomato is not a vegetable but a fruit and, therefore, a description of its culture in these pages is superfluous. To such an assertion we can only plead that this useful article of food is largely grown in vegetable gardens and on allotments and, consequently, we have no hesitation, as this is not a botany book, in describing the usual methods of cultivation.

When all goes well few things are easier to grow than the tomato, but—and this is a very big *but*—when conditions are adverse or the weather is unseasonable, the man who is rearing a score or more of plants will find that, like the policeman in the play, his lot is not a happy one.

The first point to note when dealing with tomatoes is that they require a lengthy period of growth and, as seeds cannot be sown in the ordinary way sooner than April, there are few chances of getting a ripened crop before the frosts set in unless sowings may be made in heat early in the year, preferably during January. If such is impossible, it will be advisable to buy good sturdy seedlings in May or June at a cost of about fourpence each and not to grow from seed.

Those who wish to rear plants from seed should procure one or two five-inch pots and almost fill them with a

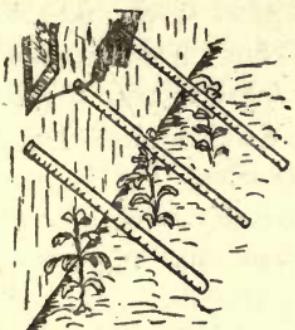


Fig. 1.

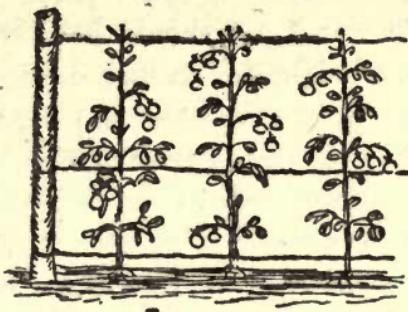


Fig. 2.



Fig. 3.

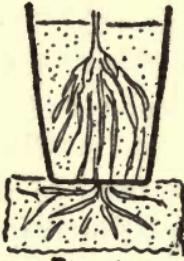


Fig. 4.

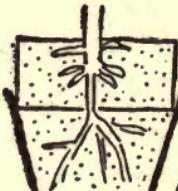


Fig. 5.



Fig. 6.



Fig. 7.

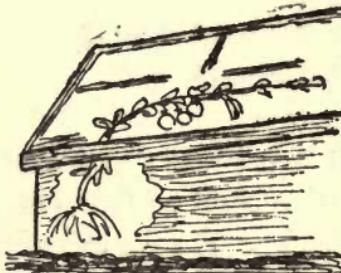


Fig. 8.

PLATE 13.—Tomato Culture. Outdoor tomatoes placed close to a wall may be protected against inclement weather by leaning an old hearthrug on three or four poles as shown in Fig. 1. Fig. 2 shows how outdoor tomatoes should be staked. Figs. 3, 4 and 5 illustrate the potting hints in Chapter XIX. Defoliation is necessary for good growth; cut out the angle growths (Fig. 6). Fig. 7 shows how to effect fertilisation among indoor flowers. Fig. 8 suggests how plants may be made to continue growing when their outdoor situations have become unsuitable by reason of the weather conditions.

mixture made of equal parts of good loam and river sand. Each pot should be given about a dozen seeds, sown an eighth of an inch down. A fair supply of luke-warm water completes the process of sowing, and the pot is placed in a conservatory or frame where the temperature approximates 60°. Whilst here the earth will frequently become dry and, whenever this happens, a shower of tepid water should be given.

Tomatoes require repotting singly at least three times during the early stages of growth ; the first when the seedlings have thrown out three leaves ; the second when they stand six inches high ; and the third when a height of twelve inches has been attained. The pots at each transference must, of course, be amply roomy for the plants and the fresh potting mixture should be kept in the warm air at least three days before use, otherwise much harm may come to the delicate seedlings. In the later repottings the sand should give place to wood ash and a trace of bone meal.

In May it will be necessary to decide whether indoor or outdoor cultivation shall be followed.

Indoor Cultivation.—If a conservatory having a sunny aspect is at our disposal the indoor method of culture will give most satisfaction. Place one seedling in each twelve-inch pot or deep box or, if the greenhouse contains a trench of earth, dig out a hole for each plant, one foot each way. Take some broken pottery, place it at the bottom of the pot, box, or hole to a depth of two inches, add an inch layer of chopped turf, place on top of this a handful of compost, made of twice as much turfy loam as rotted manure, put the root of the seed-

ling in position and fill up the sides with more of the compost. Press the earth down tightly and well water. When next the grower has a little spare time it will be worth while attending to the stakes. Push one in the ground for each plant ; place it near enough to prove a good support but not so near that it may spear the root stock. Tie the stems with raffia, not by binding stem and stick together, but by making a loop round the stem and then joining this to the stake.

The amount of water required by tomatoes is not an easy thing to decide, but a good rule is to give too little rather than too much. In hot weather, a watering morning and evening may be necessary but on other occasions a single spraying will prove ample. On no account may the air of the conservatory become damp—this is imperative when the flowers make themselves apparent—or disease will quickly attack the crop. Throughout the day keep doors and windows open to provide ventilation, but draughts are dangerous.

As the plants shoot upwards, a mass of roots will show themselves on the surface of the soil. These need covering over with a top dressing of ordinary compost, or, when the fruit is forming, with a rich compost of superphosphate, good rotted manure and loam. If the plant begins to outgrow the pot transfer the whole to a larger receptacle, or, better still, put a collar made of metal on the top of the crowded pot and fill it up with compost. Another good hint is to stand the pot on a thick piece of upturned turf ; the roots will work through the drainage hole and make themselves comfortable in the turf beneath.

Tomato plants, if left to themselves, have a tendency

of throwing out too much foliage. Consequently we must check this habit by restricting each plant to one stem and by pinching out the shoots which appear between the main and the lateral stems.

Artificial fertilization is another matter which takes up the grower's time. As bees are excluded from our conservatory we must (1) tap the stems gently at mid-day, (2) paint each flower with the same camel-hair brush to diffuse the pollen, or (3) dab each flower with a pencil to which has been fixed a swab of cotton-wool.

After the first truss of fruit has made its appearance draughts of liquid manure should be given on alternate days. This may well consist of half a pound of poultry manure to a gallon of water. On occasions a little bone meal, worked into the soil, will help to push on the fruit.

Outdoor Cultivation.—Where no conservatory is at hand good supplies of fruit may be raised in the open against a south wall or on a warm border. Cultivation follows the lines laid down for indoor culture, but the plants must be carefully hardened by being placed out of doors during the day and taken in at night, for one week prior to the final planting in the open. Also, with outdoor cultivation, it is seldom that more than four trusses of fruit ripen on one plant. Either pinch off the top of the stems when the fourth has shown itself or leave the fruit to form at will and use those that will not ripen for chutney, etc. Specimens that have coloured even slightly may be ripened indoors, on window ledges, etc.

Varieties.—For indoors, *Sutton's Best of All*, *Carters' Sunrise*, *Carters' Duke of York*, and *Frogmore Selected*

For outdoor growth, *Carters' Outdoor, Earliest of All*, *Holmes' Open Air*, as well as most of the indoor varieties.

Diseases.—Tomatoes frequently suffer from (1) Sleepy Disease, a complaint which attacks the base of the stems, (2) Spot Fungus, which manifests itself first on the lowest leaves, and (3) Black Spot, which makes unsightly blotches on the fruit. There is practically no cure for any of these diseases ; they must be noticed early and destroyed before spreading to other plants.

For Root-knot Disease in Tomatoes and Cucumbers, see Leaflet 75 of the Board of Agriculture.

CHAPTER XX

MUSHROOM CULTURE

THERE is little food value in mushrooms and, on this account, some gardeners prefer to spend their energies on raising other crops. But as this edible fungus is extremely tasty and, by careful cooking, can add considerable attractiveness to an otherwise commonplace meal, there is much to be said in favour of cultivating, at least, a limited supply.

The first thing for the mushroom grower to do is to obtain one or more bricks of the spawn—they cost about ninepence each—and as these quickly deteriorate it is highly necessary that they should be purchased from a reputable dealer who guarantees his stock. When broken, the severed edges of a good brick will reveal a network of fine, silvery, glistening threads, but if these resemble strands of coarse white cotton or if the faces of the brick are at all mouldy, we can be fairly certain that the purchase is old and not suitable for cultivation. The brick, it may be worth stating, is composed of mycelium (*i.e.*, mushroom growth) embedded in clay and cow manure; it is, therefore, clear that while the bed is being prepared the spawn should be kept in a place appropriate to its composition.

The ambitious grower will naturally select to rear his fungi on a commodious raised bed with dimensions about

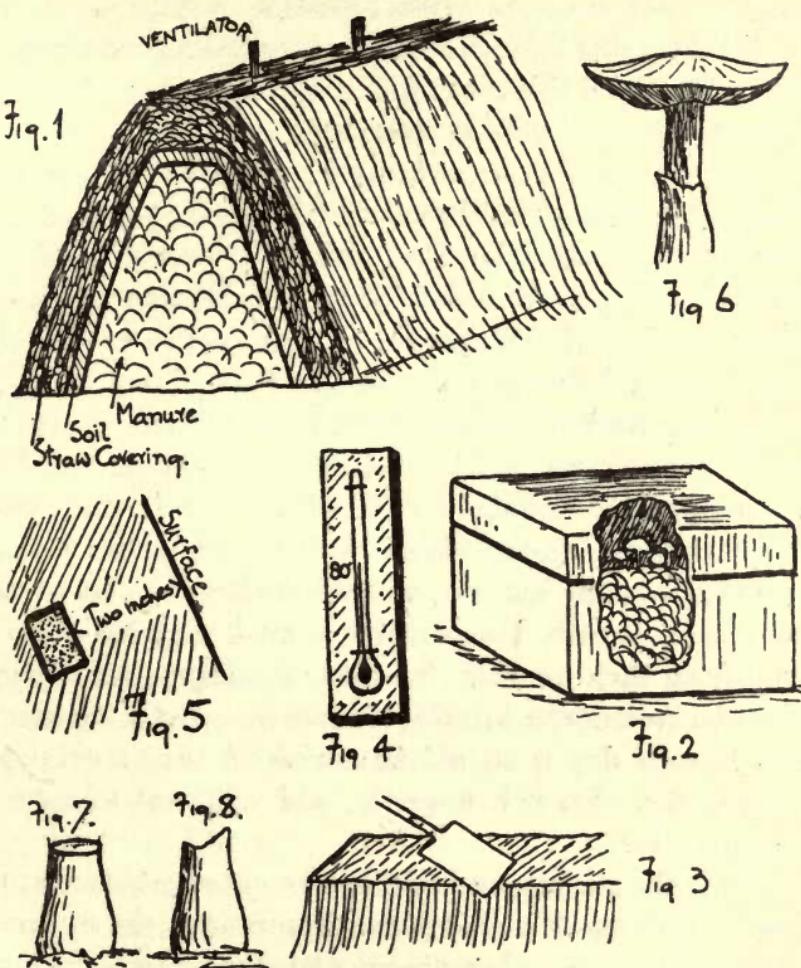


PLATE 14.—Mushroom Culture. Fig. 1, a mushroom bed. Small supplies can be raised in a box, as shown in Fig. 2. Flattening the top of the ridge (Fig. 3): see p. 160. Use a thermometer is the advice offered by Fig. 4. Fig. 5 shows the position for planting the spawn. Fig. 6 shows a mushroom that has passed its prime. Do not cut mushrooms (Fig. 7), but wrench them out of their sockets (Fig. 8).

three feet in height, three feet in width, and six feet in length ; but the more modest gardener will be satisfied with a deep two by four foot box that has a good-fitting lid. Even with this makeshift receptacle or an old tub a good crop may well be produced.

The necessary manure must be obtained in a fresh condition ; a heap that has been standing long enough to become over-heated is of no use. The best plan is to obtain small quantities daily from a stable where horses are in good condition, are fed on corn, not carrots, and where no disinfectants are used. Each day's supply must be spread out on the ground, the longest pieces of straw thrown on one side, and then a heap made of the remainder. It should not stand where the rain may beat on it and wash away some of the nutriment. When sufficient manure has accumulated the heap is allowed to remain undisturbed for about a week and then well stirred on three or four alternate mornings. All lumps must be broken apart during this process, and if the heap has become dry it should be sprinkled very sparingly with water. Do not, however, add sufficient to arrest fermentation.

When the turning and mixing have been satisfactorily performed and all rankness has disappeared, the manure is stacked in a long heap having triangular ends. As it is shovelled into position it should be constantly beaten or trodden down to ensure a good degree of firmness. The heap being roughly shaped, our next work is to trim the sides with a rake in order to remove all projecting particles ; also, we must flatten the top of the ridge and, in this flattened part, make deep chimney-shaped holes, at each foot, to allow for ventilation and

the escape of excessive heat. The bed is not yet finished ; it must stand in this condition but covered with long litter for some few days while assuming a proper degree of warmth. Quite likely the interior will at first register 100°, but we must wait until it sinks to 80° before planting the spawn. Professional growers gauge the temperature by means of test sticks which they embed deeply in the heap. Every morning the sticks are pulled out, and if they can be held just comfortably by the bare hand the growers conclude that the heap is ready. This is a good enough method for the skilled worker, but the uninitiated will be well advised to use a thermometer.

When 80° is registered the bed or heap is ready for planting. Take a brick, break it into eight pieces (a bed of the dimensions mentioned above will require about sixteen bricks, which are usually considered the equivalent of a bushel and cost, roughly, 6s.) and insert each about two inches down in the manure, the smoother surface upwards. Do this with a trowel and level the surface so that there are no ridges left to provide pockets for rainwater. A space of eight inches should be left around every piece.

Two or three days after the spawn has been fixed in position and the thermometer indicates that the temperature is on the down grade, the whole bed is covered with from one to three inches of earth, well beaten flat, according to whether a heavy or light soil is used. Clay, it may be stated, should be avoided for this purpose. Next, give a sprinkling of water and cover the mound with a layer of straw to afford protection and ensure complete darkness. Far better than straw or litter are Archangel mats, but as these cost, in pre-war times, one

or two shillings a piece, most growers will be compelled to fall back on the straw. This latter should be kept in position during windy weather by the judicious use of a ball or two of string. In wet seasons it is a wise plan to cover the sloping sides of the ridge with waterproof sheeting or other makeshift protective material. Some growers remove the straw covering when the mushrooms begin to appear, substituting brown paper, old dark-coloured casement cloth, etc. In this way a crop, undamaged by insects, is far easier to obtain.

If the situation of the outdoor ridge is sheltered, and if it runs north and south, the fungi will begin to appear in about six weeks. From this time onwards a light watering with tepid water should be given every ten days.

Mushrooms must be gathered carefully. First of all, do not use a knife, but grasp the stems low down and wrench them out of their sockets. If a knife be used or if a portion of the stem be left, the crowns will suffer to the detriment of subsequent crops. They must never be left on the ridge until the umbrella-like head turns upwards; all such specimens have grown past their prime. Finally, it is almost superfluous to add that the sooner they are eaten after gathering the better.

Outdoor beds do best when formed between July and December, but with indoor beds this rule applies with less force. The box or tub which we mentioned above will give a good crop almost at any time of the year if cultural points be strictly observed, if the receptacle is protected from the weather and if complete darkness is ensured. An indoor situation consists of a shed, out-

house, or cellar but, of course, not one forming part of a dwelling-house.

Where manure cannot be obtained in sufficient quantities to form a ridge, a supply of mushrooms may be obtained in autumn and winter by deeply embedding pieces of brick during August, in the cucumber frame. The wealth of running foliage forms a suitable protection against the light, and so the spawn soon throws out its tiny buttons which speedily develop into full-sized mushrooms. When it becomes necessary to clear away the cucumber refuse, provide shelter by means of straw and hay.

After a mushroom crop is finished do not waste the manure, it is valuable for a thousand purposes in the spring.

Leaflet No. 139 of the Board of Agriculture and Fisheries treats of Mushroom Diseases.

CHAPTER XXI

SALAD VEGETABLES

THE great aim in growing salad vegetables, where no thought of marketing is entertained, is to rear small supplies continuously throughout the year. There is little point of having a glut of, say, lettuces in June, and feeling the want of them during the remaining eleven months. As most of the produce mentioned under this heading does not permit of storage, it is clear that the wise plan is to sow little and often. We shall then enjoy fresh produce over an extended period if not during the whole of the twelve months.

Lettuces will grow almost anywhere and in practically every kind of soil. For preference, however, they should be given permanent quarters in a bed that has been lightly dressed with natural manure and in which a small quantity of superphosphate has been sprinkled. This serves for summer and autumn produce, but the winter-sown varieties will thrive on land that was heavily manured for a previous crop. Lettuce, whether they be of the cos or cabbage variety should be grown as rapidly as possible, or they will be tough and liable to have sprouting hearts. Therefore, plant them in a warm sunny position, give plenty of plain water, feed with dilute manure water once a week when well established,

hoe between the rows, and pull alternative plants when supplies are required.

Seedlings planted out in the hottest weeks of the summer are apt to fail owing to the dryness of the ground and the heat of the sun. In their case it is impossible to adopt the above methods for promoting quick growth. They should be planted between the lines of peas, or alternating in rows with big-leaved beetroots, or even around the foot of a fruit tree, anywhere, in fact, where shade is afforded. Manure water and plain water must, of course, be supplied as before.

Sow small quantities of seed fortnightly from January to March in boxes of light friable loam kept at a temperature of 60°, and transplant, according to requirements, from March to May. Also sow very sparingly in the open, fortnightly, from March to August in the permanent quarters, thinning out the seedlings to six inches apart when three leaves appear. Sow again in October in shallow boxes kept in a cold frame, and transplant late in February if the weather permits, or select a few of the best seedlings and place singly in pots of good loam at Christmas and keep at a temperature of 60°. If sowings are made in this way a supply will be obtainable during practically the whole of the year.

Cos Lettuces—the tall slender varieties—need tying up when the hearts begin to form. Bind them two-thirds of the way up with raffia, but not twine. *Cabbage Lettuces*—the round flat varieties—do better than cos lettuces where the soil is poor, in shady localities, and when grown in pots.

Varieties worth noting are : *Mammoth White* (cos) and

Continuity (cabbage) for spring sowing, and *Black Seeded Bath* (cos) and *Hammersmith Hardy Green* (cabbage) for autumn sowing.

Birds and slugs are specially fond of lettuces, and unless they are checked will do considerable damage. Thread cotton along the rows to keep off the winged depredators, and dust lime or soot around the plants as a precautionary measure against the dreaded slugs.

Tough or bolted lettuces should not be discarded, but cooked as spinach.

Radishes, like lettuces, require a quick growth or they will be of a fibrous texture and a rank flavour. Select ground that is rich, and choose a sunny open position for the early and late crops, but a sheltered cool position for the mid-season crops. Sow seed out of doors every fortnight from the middle of March to late September, and during the remainder of the year on a hot-bed. Prepare the latter by placing a six-inch layer of good soil on a heap of manure, not too hot, and cover it with a glass frame. When the green leaves are an inch high air should be admitted on fine days by lifting the window light an inch or more.

In all cases the surface of the soil must be worked until a fine condition is obtained ; it should be quite free, for instance, from stones or lumps of earth. The seed is then scattered broadcast and the surface gently raked. Later, a certain amount of thinning-out will be needed, and, when this has been done, a half ounce of sulphate of ammonia per square yard will considerably assist quick growth ; this artificial, however, must not be applied if

the ground is known to contain much nitrogen or the foliage of the radishes grows rank at the expense of the roots. If it is noticed that bulbing does not proceed as it should, withhold the sulphate of ammonia and apply superphosphate (one ounce per square yard) when sowing subsequent batches.

Radishes need not be grown in regular beds ; rather sow the seeds along the edges of ornamental flower plots, on potato plots if the crop is an early one, on rubbish heaps, under trees, or on any vacant corner too small for an ordinary crop.

Varieties are round, oval, and long-rooted, according to shape, also, red and white, in colour. For outdoor culture : *Red Turnip-rooted* and *French Breakfast* (both globular) and *Black Spanish* and *Long White* (both long-rooted). For forcing : *Crimson Forcing* and *Carters' Delicatesse* (both globular) and *Wood's Early Frame* and *Earliest Frame* (both long-rooted).

The Endive is a salad vegetable of much value for winter use when other produce is scarce. It is grown from seed sown in July and August in plots of ordinary well-worked soil containing a small quantity of seasoned manure. The seeds must be sprinkled thinly, for even the young plants are bulky and require much elbow-room. When they have developed to the four-leaf stage the seedlings are thoroughly watered and then transplanted to a permanent bed, a space of one foot separating them. In order to prevent the rotting of the outer ring of foliage, it is a good plan to bank up the soil in dome-crested ridges and to root the plants in the sides of these. Some time

in September we should begin to blanch the hearts by tying up the outer leaves loosely or by placing a piece of slate, a not too heavy tile, a circle of wood, or an inverted pot over the centres.

Plants required for late use should be lifted in November with a good ball of soil clinging to the roots. All slimy or decayed outer leaves must then be removed and storage provided in a cold frame. Dry leaves or bracken spread over the crowns will maintain the blanching. Lettuces, it may be added, can be stored in the same way.

Mustard and Cress.—These popular plants are too well known to need description. They may be grown almost anywhere, but if raised in ordinary soil are apt to be very gritty when served, as no amount of washing seems able to remove all the particles of earth. Far better it is to sow thickly on wet flannel placed in a square dish or tray (a half-plate photographic dish of granite answers admirably). Keep the dish indoors, near to a window, in a hot or cold conservatory, or in a cold frame. Mustard develops quicker than cress, therefore the latter needs to be sown from three to six days before the former in cases where it is desired to gather supplies of each at the same time.

Watercress is easier to grow than most people imagine. Purchase a penny bunch and select the thickest stalks, preferably those possessing many white root hairs. Take some ordinary medicine bottles, fill them with water and place a stalk in each. Arrange the bottles on a shelf in the conservatory. In most weathers

foliage will develop at a rapid rate and provide good supplies of tender shoots. Pick these off and let the parent stalk continue reproduction. Add water to the bottles as occasion demands. Another and perhaps better plan is to sow seeds during March or September in pots of ordinary soil, standing them to half their height in bowls of water. While the seeds are germinating protect them by means of a covering sheet of glass. When plants are an inch high, permanently immerse the pots in the rain-water tub, in an aquarium, or large bowl of water. Gather carefully and remove as little of the main growth as possible.

Where a supply of water cannot be conveniently obtained, it will be well to sow Upland Cress, seeds of which may be purchased freely. This variety is difficult to distinguish from watercress, serves the same purpose, and is easy to propagate.

Sorrel.—This useful vegetable may well be grown by those who have ample room. When included in salads it imparts a pleasing sharp, almost acrid taste, and when boiled as spinach is very acceptable. Sow in mid-spring or early summer and thin out drastically. Pick the leaves when large enough; the roots may remain in the ground for a number of years. Sorrel thrives in moist but not heavy soils.

CHAPTER XXII

USEFUL HERBS

THE plants mentioned in this chapter are much appreciated by the housewife for seasoning purposes. As only small quantities are required and as the six species mentioned below are grown fairly easily, the allotment holder or gardener should make a point of raising a few roots in each case. Mint and marjoram do best in small plots, say two feet square, but parsley, chevril, thyme and sage make attractive edgings for the ordinary flower beds. It may be well to remind the grower in gardens that the plants should be reared close to the kitchen department so that the housewife may be able to collect the supplies she needs without loss of time and, when raining, without exposing herself unduly to the inclement weather.

Mint.—There are many varieties of this herb, but spearmint is the kind used for table purposes. It is cultivated in any ordinary garden soil, though it thrives best where the bed is of a rich and moist character, enjoying a fair amount of sunshine. Propagation is by means of roots. In early spring take a clump, carefully divide it, and plant the divisions about ten inches apart and two or three inches down. A week or two after this has been done a top dressing of well-rotted animal manure

may be given to promote luxuriant growth, but this will be unnecessary if fair plants are considered suitable. Plenty of water is necessary in dry weather to prevent the leaves becoming brown. In autumn, cut away all the portions of the plants showing above the surface, well cover the ground with good earth and leave till next spring. Beds require reforming every two or three years.

The great trouble with mint is not to promote growth but to arrest it, as every gardener knows. The root formations are particularly active and multiply with much rapidity, encroaching upon the neighbouring plots to their serious detriment. In order to check this spread of the rootlets, it is a good plan to take four wide planks, each two feet long, and to bury them in the ground in such a way that they form a frame around the mint bed. The roots do not travel much below the surface and, therefore, this wooden framework serves to keep them within bounds.

It is usual to dry the leaves of mint just before the flowers form in order to have a supply of seasoning for winter use. A better method is to lift a few plants in October, place them in a fair-sized box, and stand in a warm greenhouse. Shoots will rapidly appear if water be applied regularly.

Marjoram.—There are more than twenty-four kinds of this plant; sweet or knotted marjoram, however, is the variety used for seasoning. It may be grown as an annual by sowing seeds very lightly on fine soil, during March, along a sunny border. Gathering is performed when required or, for winter use, just prior to the opening of the flowers. Another form of propagation is by means

of cuttings, which should be taken in February, placed in pots of good soil and transferred to an open border in April.

Parsley is of considerable value for flavouring and garnishing. There are many varieties, the differences chiefly bear on the shape of the leaf (*i.e.*, crested, fern-leaved, curled, moss-curled, etc.). Sow sparingly in ground previously treated with superphosphate during March, and thin out when the young shoots are large enough to handle. Allow about four inches between the plants. Gather as required, but cut away coarse leaves to make room for fresh shoots. Neglect to thin out and trim induces the formation of seeds, which is undesirable. Never remove all the leaves from a plant at the same time.

Autumn sowings may be made in the open for providing winter and early spring supplies, but a sheltered spot is necessary. When the weather becomes inclement it is advisable to give protection to the plants with the assistance of a sheet of glass. Support this an inch or more above the leaves by means of four iron uprights such as rock-plant enthusiasts use.

Chevril is a useful substitute for parsley, which it resembles in no little degree. Growth should be rapid if good flavour is desired ; in other respects, propagation follows the lines laid down for parsley.

Besides the herb known as chevril, there is also a species known as the *Turnip-Rooted Chevril*, which may be profitably described here. This plant produces short, light, yellow roots of delicate but perhaps curious flavour.

Sow seeds in autumn, which will germinate in spring, on well-dug and manured ground. Water, hoe, and thin as for carrots. The foliage dies down in August when the roots are ready for the kitchen. Leave them in the ground until required for use, as with parsnips.

Thyme.—Two varieties are commonly grown of this fragrant herb, the garden and lemon-scented thyme. The garden variety is raised from seeds, cuttings, or root divisions, but the lemon-scented should be propagated by either of the two latter means only. With both species a warm sunny position and a fairly dry soil are necessary. The shoots should be picked as the flowers form and dried in the sun for subsequent use.

Sage.—This herb is of Southern European origin and accordingly requires a warm sheltered aspect for proper growth. Propagation is usually practised by means of cuttings taken in April or May. These young shoots are potted in a sandy soil and stood in a cold frame where they must be well watered until root action commences. When the plants are established, they should be trimmed constantly, though not drastically, to promote a bushy growth.

CHAPTER XXIII

MISCELLANEOUS CROPS

Rhubarb proves a most useful dish at a time of the year when garden produce is scarce and, if on this account alone, a bed should be prepared in every allotment and small plot. The medicinal value of rhubarb is well known, but it may be wise to point out that its acid properties do not agree with all constitutions. Also a word of caution may be offered against using the leaves as greens. In the spring of 1917 when foodstuffs were scarce, many people cooked this part of the plant, and some who partook of it at their meals succumbed.

Rhubarb may be grown from seed, sown in the early autumn, but as a good crop cannot be raised in this way until two or more seasons have elapsed, it is far more reasonable to cultivate from stools. These fleshy, ungainly roots may be purchased for about sixpence and, if placed in soil well dug and richly manured, in early spring, stalks may be pulled later in the same season.

If it is desired to establish a good bed which will last for years, three or four stools should be purchased and cut into portions so that each possesses two or three crowns or buds. The bed is then dug to a good depth, four feet if possible, richly manured and the crowns planted with three inches of earth above them. We should remember that the leaves and stalks when full grown are of con-

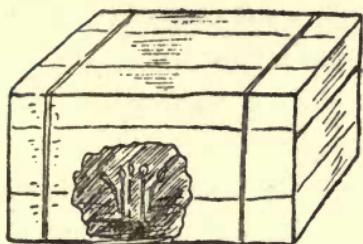


Fig. 1.

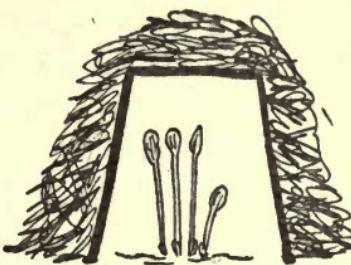


Fig. 2.

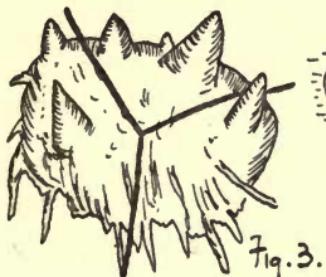


Fig. 3.

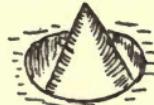


Fig. 4.

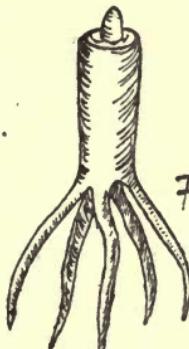


Fig. 5.



Fig. 7

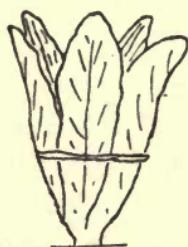


Fig. 8.



Fig. 6.

PLATE 15.—Hints on the Growth of Rhubarb and Seakale. Figs. 1 and 2 are suggested methods for forcing rhubarb and seakale. Propagate rhubarb plants by cutting up the stools (Fig. 3) and planting them just below the level of the ground (Fig. 4). Fig. 5 represents a root of seakale with the thong-like rootlets, whilst Fig. 6 shows how the rootlets should be potted. Figs. 7 and 8 show the correct and incorrect way of binding lettuces.

siderable size ; accordingly, the divided stools must be planted with ample room between them, say three feet, all ways. Stalks should not be pulled the first season from stools that have been cut, but left to die down. This will provide for strong rich growth the second and succeeding seasons.

All rhubarb beds need copious supplies of liquid manure in the late spring and summer and, in autumn, the ground should be carefully forked and stable manure worked in.

Forced rhubarb is a delicacy from Christmas until the outdoor supplies are ready in spring. In October take half a dozen well martued crowns and pack them in a stout box with good soil all round. Place the box in a cupboard near the kitchen fireplace, on the pipes of the heated greenhouse, or anywhere where they can obtain gentle but constant warmth. If the chosen situation is not dark (*i.e.*, the darkness provided by a cupboard is sufficient), place an upturned box over the roots. Provide moisture by means of sprinklings of warm water every second day, and give supplies of liquid manure weekly. Afterwards throw the stools away as, when used for forcing, they are almost spent.

An early supply may be grown out of doors by placing an old tub, pail, or box over the crowns and banking straw around it. A good mulching of manure will considerably hasten growth.

Seakale is cultivated on much the same lines as rhubarb, but the best supplies are always grown in darkness. Crops raised from seed take too long to mature;

consequently the grower should procure two-year-old roots or the thong-like rootlets which appear as fingers to full grown roots. The soil need not be chosen with too great a care as seakale will thrive in almost any ground as long as it is made rich with well-seasoned manure. Its natural habitation, however, is on the seashore and, accordingly, a sandy loam is what it most prefers.

In November obtain a supply of the thong-like rootlets, cut the tops and tails so that the former resembles the end of an unsharpened pencil and the latter a sharpened end. Plant them upright in the open, in drills, as close together as convenient, but an inch or more below the level of the ground. In May, replant in the permanent bed, a foot apart each way. As growth proceeds examine each plant and where a number of shoots are found springing from a crown, scratch off all but the sturdiest one. Late in the year cover each crown with an upturned flower pot and surround with a heap of not too fresh manure. Another plan is to dig up the crown and force as for rhubarb, but when this is done the thongs should be removed to provide subsequent supplies.

Horseradish.—This tasty vegetable will grow anywhere and under almost any conditions, but, if left to its own devices, will produce inferior roots and prove a nuisance, in the bargain. Bad cultivation results in stumpy, twisted roots which spread rapidly in all directions causing harm to surrounding crops. The smallest portion of the roots will spring up and grow; accordingly we must check its progress unless

we wish it to master, eventually, the neighbouring plots.

In November the bed should be prepared. Dig three feet down and arrange a layer of stable manure, which must not be incorporated with the soil above. Take some straight roots, five or six inches long, each possessing a healthy-looking crown, remove any side growth, and plant vertically—nine inches apart—quite six inches below the surface. Ten months later the crop may be lifted and the roots, not needed for immediate use, stored in dry sand. If a whole root is not used for one scraping the remaining portion may be buried in the ground until next required.

Spinach.—The varieties of this vegetable are legion, but for purposes of simple classification they may be divided into three classes as follows :—

Summer Spinach.—This round seed variety is sown from January to June on land which has been deeply dug and fairly well manured. Before sowing, which should be done in dry weather, rake the bed quite flat and free from stones and hard lumps of earth, then run drills, a foot apart, across the plot and drop the seeds in an inch below the surface. These latter should be soaked in water for some hours before use ; the time required for germination will then be considerably reduced. When the seedlings are large enough to handle they should be thinned out to four inches apart, and, later, when they stand five inches high, thin again to nine inches apart. Use the plants that have been pulled out in the second thinning for kitchen purposes. When gathering, cut away the whole of the plants.

Do not sow considerable areas at a time, but make successional sowings every fortnight ; this will avoid a glut of produce at any given period. Also, when space is limited, sow between the rows of the earliest peas. Cut out any buds that are about to burst into flower, as these latter attract green fly.

Winter Spinach is usually of the prickly variety. Sow from the beginning of August to the first week in October, in ground as before but more sheltered. In all cases give sufficient water and liquid manure at intervals. An application of sulphate of ammonia, two pounds to the rod, will prove beneficial when the shoots are about three inches high. Gather the largest leaves when ready and do not cut off the whole of the plant, as suggested for the summer kinds.

Spinach Beet is an accommodating form of beetroot which has an abundance of leaves suitable for cooking as spinach. Sow during late March or April, one and a half inches deep, in rows fifteen inches apart, the ground being prepared as for ordinary beetroots. Drastic thinning is necessary when the seedlings are four inches high. Gather the leaves singly, always picking the outer ones first.

Varieties worth noting are : *Longstanding*, *New Zealand*, and *Thick Leaved Round* for summer sowings, and *Giant Leaved Winter* and *Common Prickly* for winter. Also *Perpetual Spinach* or *Spinach Beet*.

Asparagus.—It is doubtful whether we ought to grow this delicious vegetable now, as it requires much room and calls for plenty of attention. For those who are not restricted in space and wish to grow a crop, we give the

following brief details as they appear in "An Encyclopaedia of Gardening":—

"*Outdoor Culture*, soil, deep rich sandy loam. Position, open and sunny preferably; will succeed, however, in partial shade. Preparation of soil: In October or November, trench two spits deep and break up third spit with fork. Put a thick layer of manure over third spit and work in a liberal quantity of old mortar, decayed vegetable matter and rotten manure among upper spits. In March, double dig the soil again and add layer of decayed manure between first and second spits. In case of heavy wet soils put a thick layer of brick rubble under second spit in October. Plant in April. Open a trench 12 in. deep on each side of row thus A and spread out roots on each side; plants to be 15 in. apart. Fill up trenches with soil and make level. 'Crowns' or points of each plant to be 5 in. below the surface. Mulch with decayed manure. Three-year-old plants best for planting. Cutting: No shoots to be removed first year, moderate quantity the second year, freely afterwards. Shoots should not be less than 6 in. long when cut. Cease cutting end of June. General treatment: Apply manures as advised below. Keep beds free of weeds. Cut down stems early in November. Top-dress with decayed manure in November, previously lightly forking up surface and cover with sprinkling of soil. In March, lightly fork over surface, rake off rough particles into alley and leave smooth and neat. Solid manures: (a) Decayed horse manure for heavy soils; cow or pig manure for light soils; (b) seaweed mixed with above manures and applied as a top dressing in November; (c) common salt, 1 oz. to a square yard, applied once a month, May to September, etc. Liquid manures: (d) 2 oz. potash, 2 oz. superphosphate, and 1 oz. sulphate of ammonia to each gallon of water, applied in June; (e) Draining from manure heap applied frequently in April to September."

CHAPTER XXIV

VEGECULTURE MONTH BY MONTH

JANUARY.

1. Make plans for the year.
2. Measure the ground, divide up the plots, and order the necessary seed.
3. Dig over as much ground as possible when weather conditions permit.
4. When frosty, burn rubbish and save the potash.
5. Prepare the hotbed.
6. Sow tomatoes in heat.
7. Sow lettuces every fortnight from now till March in boxes.
8. Pile earth around the stems of the brassica family.
9. Sow Brussels sprouts under glass and keep at a temperature of 60° or 70°.
10. Treat cauliflower seeds in the same way, towards the end of the month.
11. If no autumn sowing was made of onions sow for an early crop in shallow boxes.
12. Make a sowing of summer spinach now and follow it up with others every fortnight.
13. Give an eye to the sprouting potatoes. Remove any that become soft.
14. All kinds of early vegetables may be forced if a little care and attention can be expended upon them.
15. Drain waterlogged ground.

FEBRUARY.

1. It is important that good progress should be made this month in digging and trenching.
2. Prepare the onion bed and fork in wood ashes and soot. Tread it well.
3. Late in the month sow cucumber seed for growth on a hotbed.
4. Transplant the October-sown lettuces; place them in a well-screened spot.
5. Propagate sweet marjoram by taking cuttings.
6. If the weather is mild, sow turnips to mature before the ground is needed for summer lettuces.
7. Towards the end of the month sow broad beans in light rich soil.
8. Plant shallots in a dry situation.
9. Go over the winter cabbages and savoys and give them any attention they may require.
10. Sow parsnips as soon as the ground is sufficiently dry.
11. If the carrot fly is likely to be troublesome sow an early kind of carrot seed.
12. Sow cabbage seed under glass and keep it at a temperature of 60° or 70°.
13. Attend to the rhubarb bed. Cover over a few stools to force on growth.
14. The cold frame should now be used for promoting all sorts of early growth.

MARCH.

(Many sowings suggested below should be held over till April if the ground is cold and damp.)

1. Finish digging operations.

2. Burn all rubbish that is not fit to dig into the ground. Save the potash.
3. Transplant January-sown lettuces, as required, from now onwards.
4. Sow, towards the end of the month, early varieties of cabbages.
5. Plant cloves of garlic.
6. Sow early peas in the open.
7. Sow onions in the bed already prepared.
8. Sow lettuces in the open from now till August.
9. Sow radishes every fortnight.
10. Sow mustard and cress weekly at first, and, when more greenstuff is procurable, every fortnight.
11. Watercress may be sown in pots now.
12. At the end of this month make a sowing of spinach beet.
13. Put the finishing touches to the asparagus bed.
14. If the weather is seasonable harden the Brussels sprout seedlings.
15. Sow celery and celeriac in shallow boxes, in heat.
16. Early potatoes may be planted if the ground is suitable.

APRIL.

1. Sow kale for the winter.
2. Stake the early peas.
3. Transplant the January-sown onions.
4. Sow carrots both early and main-crop varieties, early in the month.
5. During the first few days of April sow seeds of the vegetable marrow.
6. Sow beetroots on a portion of last year's potato bed.

7. The parsnip seedlings should begin to show thirty days after sowing. Investigate the rows, if there is no sign of them, and sow afresh if concluded necessary.
8. Plant Jerusalem and Chinese artichokes.
9. Bed out February-sown cabbages.
10. Plant out Brussels sprouts sown under glass in January.
11. Treat cauliflowers, previously hardened, in the same way.
12. Sow cauliflower seeds for late autumn cutting.
13. Sow two kinds of broccoli, for cutting between September and December and January and April.
14. Plant asparagus in trenches.
15. Propagate sage by means of cuttings.
16. The hoe is a valuable tool during this and the next six months.

MAY.

1. Earth up the early potatoes and have the main crops in by now at the very latest.
2. Sow broccoli for cutting during April to June of the next year.
3. Harden the celery and celeriac seedlings prior to transplanting.
4. About six weeks after sowing, harden the vegetable marrow seedlings in a cold frame.
5. Sow seeds of the vegetable marrow out of doors if no April sowing was made.
6. Cucumber seeds may be sown late in the month for cold frame culture.

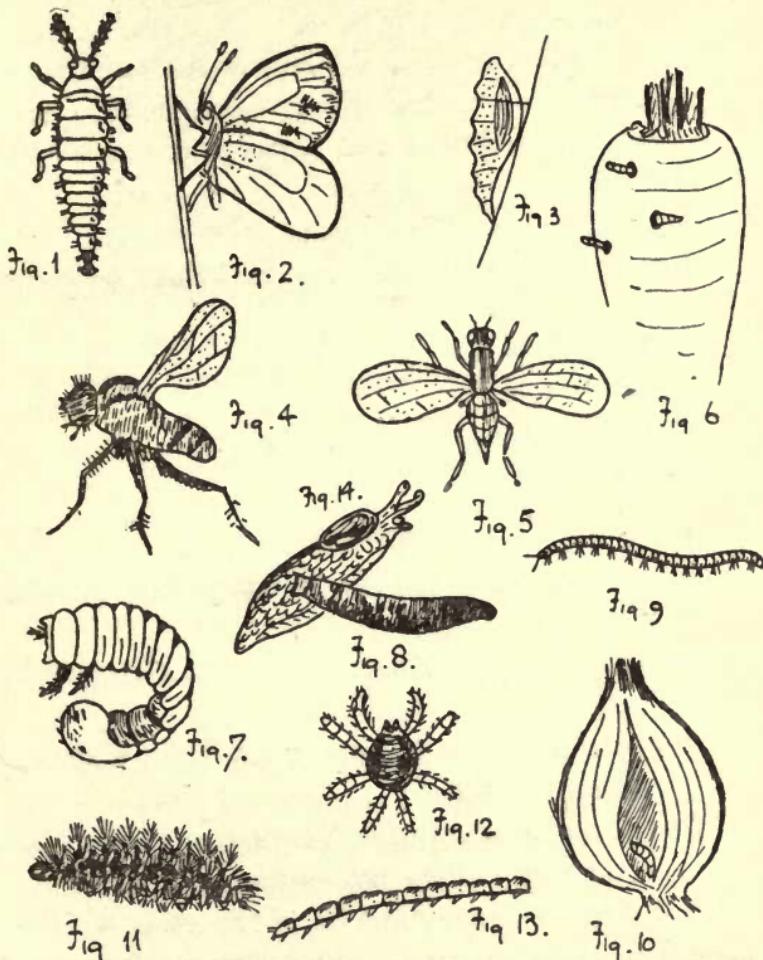


PLATE 16.—Foes of the Vegetable Grower. Fig. 1, Black Fly. Figs. 2 and 3, Cabbage Butterfly and Chrysalis. Fig. 4, Cabbage Root Fly. Figs. 5 and 6, Carrot Fly. Fig. 7, Cockchafer. Fig. 8, Grub of Daddy Long Legs. Fig. 9, Millipede. Fig. 10, Onion Fly. Fig. 11, Tiger Moth larva. Fig. 12, Red Spider. Fig. 13, Wireworm. Fig. 14, Slug.

7. If no seeds of the tomato were planted in January buy small plants in pots.
8. Sow chives in shallow rows.
9. Thin carrots towards the end of the month, and repeat the operation six weeks later. Treat onions, beetroots, and parsnips the same way.
10. Stake the main-crop peas.
11. Sow runner and dwarf beans, after soaking.
12. Pick and dry the delicate leaves of mint for winter use.
13. Bed out seakale.
14. Eradicate weeds.
15. Water the young plants carefully.
16. Tie up lettuces.

JUNE.

1. This is a busy month, tending the growing seedlings.
2. Scrape the earth away from the sides of the shallots.
3. Remove the tops of the broad bean stalks, if attacked by the fly.
4. Tie up the tomato plants, pinch out the leaf buds, and attend to other cultural requirements.
5. Cut early cabbages, but leave the stalk with the four lowest leaves ; a second crop of leaves will be thus provided.
6. Bed out April-sown cauliflowers.
7. Bed out broccoli for cutting between September and December, and transplant to temporary quarters those for cutting between January and April.
8. Earth up all potatoes.

9. Stake the runner beans.
10. Successional sowings of beans and peas are valuable.
11. Give the well established plants occasional doses of manure water.
12. Find something to grow on land made vacant by the gathering of spinach and turnip tops.

JULY.

1. Use the hoe on all possible occasions.
2. Sow cabbages and coleworts for next spring.
3. Bed out the broccoli for cutting between January and April.
4. Dig trenches for the celery plants and put them in their new quarters.
5. Give a thought to the care of the cucumbers on the hot-bed and under glass. This is the time to combat the red spider.
6. Read the chapter on tomatoes and follow the advice given for dealing with mature plants.
7. Thin out the beetroot and put soot on the bed to check the slugs.
8. Early mushroom beds may now be formed.
9. Lift the shallots and spread them in the sun to dry.
10. Tie in knots the long thin stems of garlic to arrest the formation of heads.
11. Sow endive seeds in well worked soil.
12. Spray the potato haulms.
13. Early potatoes may now be dug.
14. Many crops must be thinned ; the thinnings are usually large enough for kitchen use, at this time of the year.

15. Protect freshly planted seedlings from the sun.
16. See that all growth under glass has plenty of air.

AUGUST.

1. Leave one or more sprays of beans and peas for seed requirements ; pick pods on all others before the seeds mature.
2. As ground is cleared of crops put in other plants. Leave next year's cabbage plot, alone, vacant.
3. Dust the celery seedlings at intervals with soot and earth-up.
4. Dig up roots of turnip-rooted chevril.
5. Commence to sow winter spinach and savoys.
6. Plant leeks in their permanent quarters.
7. Provide vegetable marrows with copious supplies of moisture.
8. Dry the herbs for winter use just as they begin to flower.
9. Spray main-crop potatoes.
10. Hand-pick the caterpillars on cabbages.
11. Keep the hoe going, especially in dry weather.
12. Kill weeds before they begin to seed.
13. Liquid manure is of much use during this month.
14. Harvest all crops that are mature.
15. Keep a careful watch on the tomatoes.

SEPTEMBER.

1. Make preparations for collecting home-grown seed.
2. Cease sowing outdoor radishes.
3. Begin to blanch endives.
4. An autumn sowing of watercress may be made now.
5. Bed out July-sown coleworts for use next spring.

6. A second earthing up of celery is now timely.
7. At the end of this month dig up outdoor tomatoes which have not ripened and replant them, lying horizontally in cold frames.
8. Lift chives.
9. Lift early onions and bulbs of garlic.
10. Lift carrots and store in sand.
11. Lift the late potatoes, and leave on the surface for some hours to dry.
12. Make war on the caterpillars and slugs.
13. Sow onions in order to obtain a supply of early bulbs next year.
14. See to the cauliflowers ; it may be necessary to bend some of the leaves over the heads to protect them against frost and fogs.
15. Put lime on vacant land infested with wireworms.

OCTOBER.

1. Gather in the remaining beetroots.
2. Sow broad beans in a sheltered spot for early supplies.
3. Lift the celeriac plants and store in dry sand.
4. Chinese artichokes are now fit to lift, as required for the table.
5. Dig and manure the ground for cabbages.
6. Attend to the Brussels sprouts. Break off all leaves which shade the sprouts.
7. Make a sowing of lettuces in boxes and keep in a cold frame.
8. Prepare the asparagus bed.
9. Cover up the outdoor frames when the temperature falls rapidly at nights.

10. The bonfire season opens. Carefully preserve, in a dry condition the ashes, or dig them into the ground without loss of time.
11. Cut the dried stems of the peas and beans and bury them. Leave the roots in the soil. They are rich in nitrogen.
12. Gather the leaves on the paths, etc., and store in a bin for manurial purposes or dig them into the ground.
13. Sow radishes in heat for winter supplies.
14. Look through all stored root crops and throw out any specimens showing disease.
15. Leeks now become a profitable crop.

NOVEMBER.

1. A third earthing-up of celery is now necessary.
2. Jerusalem artichokes should be lifted if slugs attack them ; otherwise they may remain in the ground until required.
3. Pull up the weeds in the winter onion bed.
4. Sow dwarf beans for forcing.
5. Clear the rhubarb bed and fork in manure.
6. Dust lime on the haunts of slugs.
7. Bend one or more large leaves over the heads of broccoli to afford protection ; heel them if necessary.
8. Prepare seakale for potting.
9. Ventilate cold frames and carefully examine the contents.
10. Parsnips are now fit for use.
11. All spare moments should be directed to digging operations.

12. A horseradish bed may be prepared now.
13. Force outdoor rhubarb by inverting old pails and boxes, wrapped around with straw.
14. Tidy the herb beds.
15. Scour the land for the haulms of potatoes and burn them.

DECEMBER.

1. Potato seed should be arranged for sprouting.
This is one of the most important occupations of the month.
2. Lift a few stools of rhubarb and force in the dark and heat.
3. Proceed with the digging and trenching.
4. Pot a few October-sown lettuces and grow on in the warmth.
5. Grow a few potatoes in boxes, kept in a warm place.
6. Trim hedges, if not already done, and look out for stakes suitable for the peas.
7. All vacant ground should be ridged.
8. Read Chapter VI., dealing with hotbeds, and sow carrots, etc., as suggested.

APPENDIX I

DISEASES AND PESTS WHICH ATTACK VEGETABLES

EVERYONE interested in vegeculture should possess the following Board of Agriculture Leaflets, which deal fully with the subjects stated. They may be obtained free of charge by applying to 3, St. James's Square, London, S.W. 1. Applications sent through the post need not be stamped.

SUBJECT.	NUMBER.
Aphides or Plant Lice	104
Asparagus Beetle	47
Asparagus Fly	124
Bacterial Disease of Tomatoes	152
Bean and Pea Beetles	150
Bean and Pea Thrips	48
Bean and Pea Weevils	19
Bean Pod Canker	185
Black Fly	48
Black Leg or Potato Stem Rot	117
Black Rot of Cabbages, Turnips, etc.	200
Black Scab of Potatoes	105
Black Stripe of Tomatoes	164
Cabbage Moth	109
Cabbage Root Fly	122
Carrot Fly	38
Celery Fly	35
Centipedes and Millipedes	94
Crane Fly	11

SUBJECT.	NUMBER.
Cucumber and Melon Leaf Blotch	76
Cucumbers and Tomatoes, Root-Knot Disease in	75
Daddy-Long-Legs and Crane Fly	11
Flea Beetles	3
Fly, Turnip	3
Melon and Cucumber Leaf Blotch	76
Millipedes and Centipedes	94
Mushroom Disease	139
Onion Fly	31
Onion Mildew	178
Pea and Bean Beetles	150
Pea and Bean Thrips or Black Fly	48
Pea and Bean Weevils	19
Plant Lice or Aphides	104
Potato Disease.	23
Potato Leaf Curl	164
Potato Scab	137
Potato Stem Root	117
Red Spiders	41
Sleepy Disease of Tomatoes	116
Slugs and Snails	132
Surface Caterpillars	33
Tent Caterpillars	69
Thrips of Pea and Bean	48
Tomatoes, Root-Knot Disease in	75
Turnip Mud Beetle	143
Wart Disease of Potatoes	105
White Rust of Cabbages	163
Winter Rot of Potatoes	193
Wireworms	10

APPENDIX II

A TIME TABLE OF GROWTH

(a) Denotes the average interval between sowing and the first appearance of the plant above ground.
 (b) Denotes the interval between sowing and gathering the crop.

Plant.	a (days).	b (weeks).	Plant.	a (days).	b (weeks).
Artichoke, Jerusalem	—	38	Leek . . .	15	36
Beans, Broad .	30	18	Lettuce . . .	10	10
Beans, Runner .	20	18	Mustard & Cress .	—	2
Beetroot . . .	25	18	Onion (variable with the kind) .	25	25
Borecole or Kale	10	20	Parsnip . . .	30	30
Broccoli (autumn)	10	20	Pea . . .	15	12
Brussels Sprouts	10	20	Potato (Early) .	20	14
Cabbage . . .	10	19	Radish . . .	10	8
Carrot . . .	20	25	Savoy . . .	14	25
Cauliflower . .	12	22	Spinach . . .	14	12
Celery . . .	15	24	Turnip . . .	14	10
Celeriac . . .	15	24	Vegetable Marrow	14	20
Cucumber . .	15	15			

A TABLE GIVING DISTANCES PLANTS SHOULD STAND IN THEIR PERMANENT QUARTERS.

Plant.	Between each row.	Between each plant in a row.	Plant.	Between each row.	Between each plant in a row.
Artichoke, Jerusalem	16 in.	16 in.	Chives . .	10 in.	6 in.
Beans, Broad .	2 ft.	10 in.	Kohl-Rabi . .	15 in.	8 in.
Beans, Runner .	5 ft.	8 in.	Leek . . .	4 ft.	20 in.
Beetroot . . .	15 in.	9 in.	Lettuce . . .	1 ft.	18 in.
Borecole or Kale .	2 ft.	18 in.	Onion . . .	6 in.	4-12 in.
Broccoli (all kinds)	2 ft.	2 ft.	Parsnip . . .	18 in.	8 in.
Brussels Sprouts .	3 ft.	3 ft.	Pea . . .	5 ft.	4 in.
Cabbage . . .	2 ft.	2 ft.	Potato (Early) .	20 in.	12 in.
Carrot . . .	9 in.	9 in.	Potato (Others)	25-30 in.	15 in.
Cauliflower . .	18 in.	12 in.	Radish . . .	6 in.	2 in.
Celery . . .	4 ft.	9 in.	Savoy . . .	2 ft.	2 ft.
Celeriac . . .	18 in.	18 in.	Shallot . . .	8 in.	8 in.
			Spinach . . .	1 ft.	1 ft.
			Turnip . . .	10 in.	10 in.

"After all has been said and done, it is the food grower that comes inevitably to the front at this moment. He is the man behind the forces of war, and nothing can move very far without his co-operation and labour. You may appropriate millions of money to Aeroplanes, Artillery, Dreadnoughts, and Zeppelins, but those millions are little better than useless if your food supplies come to a sudden or a premature end. So, let us smallholders realise our importance in the scheme of things."—*The Smallholder*.

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